

## XV. NEOTROPICAL HOMOPTERA OF THE CARNEGIE MUSEUM.

### PART 3. REPORT UPON THE COLLECTIONS IN THE SUBFAMILY *Bythoscopinæ*, WITH DESCRIPTIONS OF NEW SPECIES.

(PLATES LV; LVI, FIG. 4; AND LIX, FIG. 1.)

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The additions to the Bythoscopid fauna of South America included here only serve to emphasize the wealth of species to be discovered, when there shall be an intensive collection of these little creatures in the various habitats included in the great Amazonian basin. It may be assumed as practically certain that these species represent a wide diversity of host-plants, and careful collection of material, with accurate records of the plants on which they occur, would serve an important purpose in determining their biological relations, and also the possibilities of their dispersion and economic menace to other countries. Doubtless many of the species are restricted to tropical plants, but our experience with a number of destructive pests, which have been introduced in the past, justifies a careful study of the possible immigrants from this region.

Owing to the brevity of many of the early descriptions, or the fact that they did not include mention of important characters for identification, there has been no little difficulty in arriving at positive conclusions as to some of the species. As the types of Stål's species are preserved in the Naturhistoriska Riksmuseet at Stockholm, it seemed especially desirable to secure reliable figures, at least for some of the most uncertain species. Through the generous cooperation of Dr. W. J. Holland, the Director of the Carnegie Museum when these studies were begun, and of Dr. Sjöstedt, the Intendent of the Riksmuseet, it has been possible to secure the services of a competent artist, Madame Ekblom, to prepare illustrations from a number of the types.

The plates accompanying this and the following paper are the result of this fortunate arrangement. In addition to the fact that these plates have enabled us to definitely fix some of the uncertain species, we feel sure they will prove of special value to future students of the group, who may not be able to consult the types in Stockholm.

In this connection, I wish to express my appreciation of the help given me by Mr. Douglas Stewart, the successor of Dr. Holland in the Directorship of the Carnegie Museum.

Order **HEMIPTERA** Linnæus.

Suborder **HOMOPTERA** Latreille.

Family **CICADELLIDÆ** Latreille.

Subfamily **BYTHOSCOPINÆ** Dohrn.

Genus **AGALLIA** Curtis.

*Agallia* Curtis, Entomological Magazine, Vol. I, 1833, p. 193.

1. **Agallia punctaticollis** (Stål) (Plate LV, fig. 3).

*Bythoscopus punctaticollis* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 54.

The original description given by Stål is as follows:

"Pallide testaceo-flavescens; maculis duabus parvis basalibus verticis, limbo interno lororum, maculis duabus anterioribus transversis thoracis, angulis basalibus scutelli et basi femorum nigro-fuscis; frontis lituris duabus elongatis, linea media longitudinali maculaque utrimque magna irregulari thoracis mediaque scutelli testaceis; tegminibus testaceo-, nigro-fusco- et sordide albido-variis. ♂. Long. 5.5, Lat. 1.75 mm.—(Mus. Holm.).

Caput leviter reclinato-declivum, vertice basi sursum libere prominente, lineola media suturaque frontali testaceis; fronte triangulari, latitudine basali nonnihil (quarta fere parte) longiore, a basi vix ad medium subito valde, dein apicem versus magis sensim et minus angustata, sutura frontali obtuse angulata. Thorax longitudine plus duplo latior, distincte punctatus, scutello nonnihil longior. Tegmina abdomen nonnihil superantia, testaceo-venosa, areis duabus internis clavi testaceis, tertia nigra, macula ante medium apiceque albidis; corio areolis nigro-fuscis, discoidalibus et costalibus macula media sordide albida notatis."



The main points of the foregoing are set forth in the following lines:

Pale reddish yellow; two small black spots on base of vertex; internal border of loræ, two anterior transverse spots on thorax, basal angles of scutellum, base of femora, black fuscous; front with two elongated lines. Middle longitudinal line and a large spot of variable size on each side of thorax, and middle of scutellum, testaceous; elytra varied with testaceous, blackish, fuscous, and dull white.

Head slightly obliquely sloped; base of vertex elevated; middle line and suture of front testaceous; front triangular, basal width somewhat (almost one-fourth) longer.

Stål's original description, with the appended synopsis of its main points, taken together with the figure of the type by Madame Ekblom, should make the identification of this species an easy matter. However, no specimens, which can be referred to it, have been seen by the writer.

## 2. *Agallia signata* (Stål) (Plate LV, fig. 1).

*Bythoscopus signatus* Stål, *Eugenies resa*, Ins. Hemipt., 1858, p. 291.

The diagnosis given by Stål is here reproduced:

"Pallide griseo-flavescens, margine ad oculos, maculis 2 superis lineisque 2 percurrentibus mediis basin versus sæpe confusis verticis, macula media vittaque utrimque e lineolis transversis frontis, vitta clypei, linea media, maculis nonnullis anticis duabusque majoribus late oblique triangularibus (singula interdum in duabus partita) thoracis, angulis basalibus, macula media vittaque ante hanc scutelli, maculis magnis femorum anteriorum vittaque lata posticorum, abdomine (exceptis incisuris), areolis clavi albido-venosi venisque corii pallide sordide testaceo-flavo-hyalini nigro-fuscis, hujus lineola basali ad suturam clavi nec non macula prope costam ante medium albidis. ♂, ♀. Long. 4, Lat. 1.33 mm.

Patria: Buenos Ayres, Monte-Video.

Prope *B. venosum* locandus, longior, major. Caput supra visum valde obtuse rotundato-subangulatum, vertice supra brevi, ubique æquilongo, facie nonnihil reclinato-decliva. Thorax vertice supero vix ter longior, longitudine fere duplo et dimidio latior, transversim rugulosus. Tegmina apice haud marginata."

Dark gray and resembling the darker forms of *A. sanguinolenta*. Prof. Stål's description, quoted above, was based on specimens from Buenos Aires and Montevideo. A single specimen in the collection of the Carnegie Museum from La Plata, Argentina, (Holland coll.), agrees well with the description, and especially with the figure drawn from the type by Madame Ekblom.

3. *Agallia phalerata* (Stål) (Plate LVI, fig. 4).

*Bythoscopus phaleratus* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 54.

The description published by Stål is here given:

"Pallide subsordide testaceo-flavescens, pedibus sæpius purius flavescens; faciei parte dimidia apicali (excepto margine genarum), fascia inæquali inter oculos maculisque duabus basalibus magnitudine variantibus, sæpe cum fascia illa confluentibus, thoracis margine antico, vitta media maculaque utrimque sæpe cum vitta connexa, maculis tribus haud raro confluentibus scutelli et tunc hoc totum occupantibus, disco dorsali abdominis tegminibusque nigricantibus aut nigro-fuscis, venis suturaque clavi, vena corii ad suturam clavi nec non macula utrimque subapicali oblonga marginali pallide sordide testaceo-flavescens. ♀. Long. 4.5, Lat. 1.33 mm.—(Mus. Holm. et Stål).

*B. Fruticola* angustior. Caput supra visum brevissimum, late rotundatum, medio brevius, facie levissime convexa, paullulum reclinato-decliva. Thorax antice rotundatus, longitudine plus duplo latior, scutello nonnihil longior. Tegmina abdomine nonnihil longiora, venis subtilibus."

A free translation of part of the original description is here given:

'Pallid, somewhat soiled reddish yellow; feet quite frequently purer yellow; the apical half of the face, except the margin of the cheeks, together with a shorter or longer band between the eyes, two basal spots of varying size, which are often confluent with the band just mentioned, the front margin of the thorax, a median stripe, and a spot on either side of it, often uniting with this stripe, three spots upon the scutellum, occasionally confluent, and then occupying the whole of its surface, the dorsal disk of the abdomen, and the elytra, black or blackish fuscous; the face, the suture of the clavus, the veins of the corium as far as the suture of the clavus, together with an oblong marginal subapical spot on either side, pallid dirty reddish yellow.'

The figure on Plate LVI together with the foregoing text should facilitate the determination of this species. However, no specimens, which can be referred to it, have been thus far seen by me.

4. *Agallia assimilis* (Stål) (Plate LV, fig. 4).

*Bythoscopus assimilis* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 55.

Stål's description is herewith given:

"Dilute testaceo-flavescens, pedibus, abdomine tegminibusque sordide pallidioribus; maculis tribus basalibus verticis, sutura frontali

clypeoque fere toto nigricantibus; thoracis linea media longitudinali maculaque utrimque arcuato-oblonga, illa cum angulis basalibus scutelli dilutius, his valde obscure fusco-testaceis; tegminibus dilute fusco-testaceo-venosis, venis clavi, macula obliqua ad suturam clavi prope apicem nec non macula basali areolæ basalis mediæ corii subalbidis. ♀. Long. 6, Lat. 1.75 mm.—(Mus. Holm.).

Præcedenti [*punctaticollis*] affinis, statura similis, præter colorem pallidiorem picturamque differt fronte proportionaliter latiore, utrimque minus profunde sinuata, a basi vix ad medium nonnihil, dein apicem versus parum angustata, vitta utrimque lineolis transversis fusco-testaceis formata; sutura frontali recta. Thorax impunctatus."

A free translation of the first paragraph of the foregoing follows:

Rather dilute testaceous yellow; feet, abdomen, and elytra more pallid; three spots at base of vertex, frontal suture and clypeus almost entirely black; a middle longitudinal line on the thorax and an oblong arcuate spot on each side, the former together with the basal angles of the scutellum more faintly, the latter very darkly, fuscous-testaceous; elytral veins pale fusco-testaceous; veins of clavus, oblique spot at suture toward apex, and also a spot at basal areole, and at basal and central areoles of corium, dull white.

Allied to *A. punctaticollis* and of similar size, but the color is paler and the general appearance, as given on Plate LV, fig. 4, is different. The front is proportionally wider, less deeply sinuate on each side; base not, middle somewhat, then toward apex strongly narrowed, stripe on each side of transverse line fusco-testaceous, frontal suture straight. Thorax impunctate. I have not seen this species, but the description of Stål accompanied by the free translation above given together with the figure given on Plate LV, should serve to identify it.

##### 5. *Agallia peregrinans* (Stål) (Plate LV, fig. 2).

*Bythoscopus peregrinans* Stål, *Eugenies resa*, Ins. Hemipt., 1858, p. 291.

The description given by Stål is here quoted in full:

"Pallide griseo-flavescens; maculis 2 superis verticis, maculis 3 scutelli pectoreque nigricantibus; venis tegminum ultra medium subalbidis. ♂, ♀. Long. 3.25, Lat. 1 Millim.

*Var.* vitta utrimque inæquali frontis, clypeo maculisque ocellorum nigro-fuscis.

*Patria:* Insulæ Taiti et Oahu, California, Rio Janeiro; *var. e* Rio Janeiro.

Caput obtuse rotundatum, vertice supero ubique æquilongo, facie nonnihil reclinata, fronte latitudine nonnihil longiore, prope basin utrimque sinuata, dein leviter angustata. Thorax vertice ter longior, longitudine duplo et dimidio latior. Tegmina haud marginata."



From the localities cited by Stål it appears that he may have had more than one species in hand, when he wrote his brief diagnosis. The figure of the type, given on Plate LV, may serve to identify the species, but I have seen no specimens, which could without question be referred to it. •

Genus *MACROPSIS* Lewis.

*Macropsis* Lewis, Trans. Ent. Soc. London, Vol. I, 1835, p. 49.

6. *Macropsis elegans* (Van Duzee).

*Pediopsis elegans* Van Duzee, Jamaican Hemiptera, Bull. Buffalo Acad. Nat. Sci., Vol. VIII, 1907, p. 58.

Small, slender; head wider than pronotum; vertex very narrow at apex, a little wider at eyes; front broad, narrowed rapidly to clypeus; clypeus and loræ short. Pronotum angular anteriorly, the striæ minute, distinct; hind border concave. *Genitalia: female*, last ventral segment short, narrowed and subtruncate behind, with a slender tail-like appendage about half-way from middle on each side; pygofers short, broad.

Pale yellowish creamy, the prothorax with the borders and a median stripe bright red; tips of tarsi blackish.

Length: 3.5 mm.

One specimen, Ft. Principe, Rio Guaporé, Brazil, August, 1909, C. M. Acc. No. 4043 (Haseman coll.). Originally recorded as found in Jamaica, the present record appears to indicate that the species has a wide distribution.

Genus *BYTHOSCOPIUS* Germar.

*Bythoscopus* Germar, Silbermann's Revue Entomologique, Vol. I, 1833, p. 180.

7. *Bythoscopus pallidus* sp. nov.

Robust; head broad, narrower than pronotum; vertex very short; front tumid, narrowed very abruptly from antennal pits; clypeus longer than broad; loræ short; cheeks broad, sinuate. Pronotum large, transversely striate, hind border concave; elytra minutely punctate, and setose. *Genitalia: female*, last ventral segment a little longer than preceding; hind border nearly truncate or slightly concave; ovipositor scarcely longer than pygofer; *male*, last ventral segment slightly longer than preceding; plates fused, elongate, triangular, somewhat spoon-shaped, narrowed, acute, slightly upturned at tips.

Uniformly pale greenish yellow; abdomen above slightly tinged with fulvous; elytra hyaline, with minute whitish setæ.

Length: female, 5 mm.; male, 4.5 mm.



Described from one female, *type*, from Barra, Rio Grande, Brazil, Dec. 5, 1907, C. M. Acc. No. 3533; one male, *allotype*, taken near Ft. Principe on the Rio Guaporé, Brazil, Oct. 25, 1909, C. M. Acc. No. 4043 (Haseman *coll.*).

This species is apparently nearly related to *B. misellus* Stål, described from Mexico, but is larger; the female segment nearly truncate; and the male, which apparently belongs with this female, has a very distinct structure for the fused plates.

#### 8. *Bythoscopus nigrifrons* sp. nov.

Small, robust; head very short, narrower than pronotum; vertex narrowly visible from above; front flattened, tumid below, overhanging the clypeus and loræ; clypeus short, not reaching margin of cheeks; loræ small, oblique; cheeks short, lower margin sinuate. Pronotum distinctly striate, about four times longer than vertex, truncate behind; plates short, broad at base, abruptly narrowed to blunt tips, depressed on the disk and minutely punctured, and setose.

Brown; vertex and front black; narrow margin of vertex, ocelli, and the entire face below antennal pits, whitish or faintly tinged with reddish. A small patch in the posterior margin of pronotum, and the disk of the scutellum, fuscous; elytra setose, densely black; the apical cells margined with fuscous. Beneath brown, the femora and hind tibiæ more or less suffused with fuscous; spine of the latter whitish; tarsi brown.

Length: 3.5 mm.

Described from one specimen, male, *holotype*, from Chapada, Brazil, Nov., C. M. Acc. No. 2966 (H. H. Smith *coll.*).

This is a rather striking species, considerably smaller than *B. misellus*, and most clearly distinguished by the black vertex and front, and the shape of the male plates.

#### 9. *Bythoscopus lautus* Stål. (Plate LIX, fig. 1).

*Bythoscopus lautus* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 55.

The original description of this species by Stål is as follows:

"Sordide albida, maculis quattuor verticis, duabus ocellos cingentibus, nigris; vittis duabus obsoletis frontis, vitta genarum, linea media longitudinali verticis thoracisque, hujus etiam maculis duabus minoribus anterioribus parteque basale anterieus undata, maculis scutelli areolisque tegminum nitidulorum pallidissime subtestaceis, horum venis albidis. ♀. Long. 4, Lat. 1.25 Millim.—(Mus. Holm. et Stål).

Statura fere *B. Fruticolæ*. Vertex basi levissime reflexus; facies leviter convexa, subreclinato-decliva. Thorax longitudine duplo fere et dimidio latior, scutello nonnihil longior."

A free translation is herewith given:

Dirty whitish; four spots on the vertex, two encircling the eyes, black; two faint stripes on the front, a stripe on the cheeks, a median longitudinal line on the vertex and the thorax, the latter also with two smaller anterior spots, and the basal part, which is anteriorly wavy, the spots on the scutellum and the areoles of the slightly shining elytra, very pale subtestaceous; the veins of the elytra whitish. ♀. Length, 4, width 1.25 mm. (In the Museum at Stockholm and in the Collection of Stål.)

Size almost that of *B. fruticola*. Vertex at the base very slightly reflexed, face slightly convex, slightly sloping backward. Thorax almost two and one-half times broader than long, not longer than the scutellum.

The above description and translation, together with the figure of the type by Madame Ekblom, should enable the student to recognize this species, which as yet has not been seen by the author. Judging from the figure it belongs to the genus *Agallia*.

#### Genus IDIOCERUS Lewis.

*Idiocerus* Lewis, Trans. Ent. Soc. Lond., I, 1835, p. 47.

#### 10. *Idiocerus occipitalis* sp. nov.

Slender; head very broad, much exceeding pronotum in width, moderately arched; vertex as long at middle as next the eye, rounded uniformly to front; front narrowing uniformly to clypeus. Pronotum short, narrow, nearly twice as long as vertex. Elytra narrow. *Genitalia: female*, last ventral segment larger than preceding, rounded, produced, dark brown in contrast to the pale venter; ovipositor and pygofer brown.

Dark chocolate-brown to blackish, most of the vertex and the disk of pronotum light yellowish, bordered anteriorly with brownish and enclosed by a broad dark blackish band, which includes the lateral and posterior parts of the pronotum; the eyes and a narrow margin of vertex and a broad stripe between the eyes bordered with brown; lower part of face whitish; scutellum blackish; elytra dark brown or piceous, sub-hyaline; veins blackish. Beneath, thorax and legs white.

Length: 3 mm.

One specimen, *type*, taken at Santarem, Brazil, Dec., 1909, C. M. Acc. No. 4043 (Haseman *coll.*). The large yellow spot of the vertex and pronotum imparts an appearance very different from that of the common forms of this genus.

**11. *Idiocerus albicollis* sp. nov.**

More robust than *I. occipitalis*; head broad, moderately arched; vertex scarcely longer at middle than next the eye; front convex, abruptly narrowed from antennæ to clypeus; clypeus broad, about one-half longer than wide; apex a little expanded and rounded; loræ slightly tumid, extending nearly to margin of cheek; cheeks narrow, margin nearly straight. Pronotum short, about one-half longer than vertex. *Genitalia: male*, plates elongate, triangular, slightly acuminate, and upturned at tip.

Brown; vertex and anterior part of pronotum yellow; face, thorax, and legs whitish; abdomen tinged with brown; elytra sub-hyaline, tinged with brown; costal and outer apical areoles fuscous, leaving a transparent area on the outer costal areole.

Length: 3.25 mm.

Described from one male specimen, the *type*, from Chapada, Brazil, Nov., C. M. No. 2966 (H. H. Smith *coll.*). This species has the general appearance of *I. occipitalis*, but the large yellow spot of vertex and pronotum is reduced on the pronotum, and the pronotal border and frontal bands are lighter brown; the ocelli are encircled by fuscous, and the elytra have more transparent areas.

**12. *Idiocerus eburneomaculatus* sp. nov.**

Head much wider than pronotum, broadly arched; vertex as long at middle as next the eye; front convex, narrowed sharply below the antennæ; clypeus long; loræ large, somewhat tumid; cheeks narrow, margins nearly straight. Pronotum twice as long as vertex, hind border truncate or faintly concave; scutellum large, acuminate; elytral veins weak. *Genitalia: female*, last ventral segment short, truncate; ovipositor extending a little beyond pygofer; *male*, last ventral segment longer than preceding, narrowed posteriorly; plates compressed, reaching tip of pygofer.

Bright fulvous yellow; vertex faintly greenish yellow, with two large quadrate patches of fulvous; two transverse fulvous dots just above ocelli; ocelli red. Pronotum fulvous, with four light greenish yellow stripes not reaching the hind border; scutellum fulvous, faintly marked with yellow stripes; base of clavus yellowish; two ivory-white spots on the corium, one below the middle and the other at tip of clavus; elytra otherwise transparent, tinged with golden yellow; a small spot on membrane at tip of clavus and some of the apical veins fuscous.

Length: 4 mm.

Three specimens: two females, one male; *type*, *allotype*, and *para-type*, from Brazil, taken along the Rio Guaporé below Rio S. Miguel Aug. 22, C. M. Acc. No. 4043 (Haseman *coll.*).



13. *Idiocerus costalis* sp. nov.

Head slightly wider than pronotum, short; vertex rounding uniformly to front; ocelli rather near together; front distinctly convex, short, narrowed abruptly to clypeus; clypeus short, somewhat tumid; loræ long, reaching margin of cheek; cheeks triangular; outer border nearly straight, somewhat reflexed. Pronotum short, nearly twice as long as the vertex from the dorsal view; hind border truncate; scutellum broad, acuminate at apex; middle apical cell narrow, preceded by ovate anteapical. *Genitalia: male*, plates broad at base, contracted to slender, acute, upturned tips.

Dull olive-brown; apex of scutellum yellowish; ocelli, eyes, base of clavus, the costa to the cross-vein and the elytral veins, dark fuscous, or blackish; wings smoky.

Length: 3.5 mm.

Described from one male specimen, *type*, from Province del Sara, Bolivia, 450 M., taken Nov., 1909, C. M. Acc. No. 4549 (Steinbach coll.).

This is a small species, particularly distinguished by the opaque blackish costa.

14. *Idiocerus breviatus* sp. nov.

Head large, broad, bluntly rounded in front; vertex very broad, margins nearly parallel; ocelli rather near together; base of front sub-angular, narrowed abruptly to clypeus; clypeus short; loræ long, extending beyond clypeus, merging with cheek-margin; cheek-margin slightly sinuate. Pronotum short, shorter than vertex; scutellum triangular; elytra broad and short, but extending far beyond the short abdomen. *Genitalia: male*, plates broad at base, narrowed to near the center and extending as long, narrow, upturned acutely pointed tips.

Light brown; vertex and pronotum somewhat vitreous; elytra subhyaline, somewhat fuscous on basal part and with abrupt termination at end of clavus; apex milky hyaline; hind tibiæ and tarsal joints dusky.

Length: 3 mm.; width: 1.5 mm.

One male specimen, *type*, from Chapada, Brazil, Dec., C. M. Acc. No. 2966 (H. H. Smith coll.).

This species is remarkable for its very broad and short body, and may be particularly distinguished by the strong contrast between the smoky and milky parts of the elytra.



**15. *Idiocerus flavotinctus* sp. nov.**

Head very broad; vertex short, margins parallel; ocelli rather close together; front narrow at base, widening to antennal pits; clypeus twice as wide as long, slightly expanded, truncate at tip; loræ large, merging with border of cheek; cheeks triangular, margin nearly straight. Pronotum twice as long as vertex; scutellum large, acuminate; elytra much longer than body. *Genitalia: male*, plates elongate, triangular, compressed, and upturned at tip.

Yellowish, somewhat suffused with greenish; elytra transparent, tinged with golden yellow; ocelli brown and margined with brownish; base of corium with a fuscous spot; elytral veins pale, wing-veins black; tips of rostrum and tarsal claws fuscous; venter greenish yellow; tergum golden yellow, tinged with reddish on the disk. Male plates greenish, tipped with fulvous brown.

Length: 6 mm.

Described from one specimen, male, *holotype*, from Mana River, French Guiana, June, 1917, C. M. Acc. No. 6008 (Klages coll.).

**16. *Idiocerus principensis* sp. nov.**

Head broad, distinctly arched; vertex margins parallel; ocelli nearer to the eye than to the middle line; front narrowing sharply to clypeus; clypeus broad at base, narrowed to tip; loræ reaching margin of cheek; cheek broad, margins nearly straight. Pronotum half longer than vertex; scutellum slightly acuminate. *Genitalia: female*, last ventral segment short, as long as preceding, faintly sinuate.

Light greenish, a common median stripe on vertex, pronotum and scutellum extending to a transverse band between ocelli, and a large roundish spot near the eye and a stripe behind it on pronotum, orange-red; inner border of clavus brown, commissure greenish white; outer part of clavus and the elytra hyaline, smoky at tip; a spot at base of corium and a dot on the disk dark fuscous; ocelli black. Beneath pale gray.

Length: 4 mm.

One specimen, *type*, from Ft. Principe, Rio Guaporé, Brazil, Aug., 1909, C. M. Acc. No. 4043 (Haseman coll.).

This is a handsome little species, somewhat resembling *I. flavidus*, but distinguished at once by the three orange-red stripes on the pronotum, which are in line with the spots of the vertex, and the central one with stripe on disk of scutellum.

**17. *Idiocerus exquisitus* sp. nov.**

Head broad, strongly arched in front, longer at center than next the eye; front rounded, short, contracted to clypeus; clypeus short, scarcely longer than wide; loræ broad, merging the cheek-margin; cheek triangular, border nearly straight. Pronotum scarcely longer than vertex; sinuate behind; scutellum acuminate; elytra long, rather slender. *Genitalia: female*, last ventral segment short, truncate; pygofers polished; *male*, plates narrow, compressed, curved upward, tips acute.

Greenish white, a fulvous stripe on middle of vertex and pronotum; ocelli dark brown, abdomen above black on base of middle line; apex with a large yellow spot at each side on segments two to four; elytra transparent, a large fuscous spot on the costa beyond the middle, and a dusky patch at end of clavus on inner border.

Length: 2.5 mm.

Three specimens, *type*, *allotype*, and *paratype*, from Rio Machupo, Bolivia, near Rio Guaporé, Aug. 25, 1909, C. M. Acc. No. 4043 (Haseman *coll.*). This very elegant little species is the smallest of the genus, which I have ever encountered, being smaller even than *I. minutus*, and is very distinct from other species in the markings on the abdomen, and the fuscous spots on the elytra.

**18. *Idiocerus figuratus* sp. nov.**

Broad, short; head much wider than pronotum, broadly rounded; vertex broad, as long at middle as next the eye. Pronotum strongly arched, nearly twice as long as vertex; hind border concave. *Genitalia: female*, last ventral segment slightly longer than preceding, truncate behind; ovipositor extending beyond pygofers.

Dark apple-green; vertex with two large orange-red oval spots. Pronotum with an orange fulvous arch, and narrow hind border; scutellum with disk and lateral angles, elytra with base of clavus, and a sub-sutural stripe, fulvous; face above blue-green; an orange-red band, including ocelli, from lower borders of eyes; lower part of front and clypeus yellowish white. Beneath greenish; tarsal claws blackish.

Length: 3 mm.

Described from two females, *type* and *paratype*, from Chapada, Brazil, Oct., C. M. Acc. No. 2966 (H. H. Smith *coll.*).

**19. *Idiocerus flammeus* sp. nov.**

Small; head wider than pronotum, distinctly arched; vertex as long at middle as next the eye; front somewhat tumid; clypeus widened to tip; cheek-margins sinuate. Pronotum twice as long as

vertex, slightly concave behind; elytral veins indistinct. *Genitalia: female*, last ventral segment elongate, convex; plates bulbous at base, narrow, compressed, sparsely setose at tip.

Pale yellowish, tinged with bright fulvous or sanguineous; vertex with two broad stripes extending from near base to the ocelli. Pronotum tinged with fulvous; scutellum with two whitish spots on the disk; elytra hyaline; abdomen above more or less tinged with sanguineous, below yellowish; tips of hind tibiae and the tarsal claws fuscous.

Length: 3 mm.

Described from five specimens, four females and one male, *type*, *allotype*, and *paratypes*; two females and one male from Province del Sara, Bolivia, C. M. Acc. No. 5064, Nov., 1912; two females from Province del Sara, Bolivia, 450 M., Nov., 1909, C. M. Acc. No. 4549 (Steinbach *coll.*).

#### 20. *Idiocerus vittatus* sp. nov.

Head broad; vertex long, somewhat longer at middle than next the eye; front broad, short; clypeus widened toward the tip; loræ broad, nearly touching cheek-margin; border of cheek slightly sinuate. Pronotum short, about one-half longer than vertex. *Genitalia: male*, plates elongate, triangular; tips compressed and upturned.

Apple-green with three dark orange-red stripes on the pronotum, the median one extended over vertex to base of front and united with a cross-band between ocelli and backward to the middle of the scutellum; a large spot between this stripe and the eye, and a broad stripe on each side of the pronotum. Base and inner border of clavus rich brown, as also outer border of clavus and most of corium; a black dot at base of corium and on the disk, and a fuscous spot on the costal border; apical veins dark; membrane smoky. Beneath pale greenish or dirty white; ocelli black; tip of clypeus dusky.

Length: 3.5 mm.

Described from a single male specimen, *holotype*, from Ft. Principe, Rio Guaporé, Brazil, Aug. 26, 1909, C. M. Acc. No. 4043 (Haseman *coll.*).

#### 21. *Idiocerus fulvotinctus* sp. nov.

Small; head broad, distinctly arched; vertex broad; front broad, somewhat tumid; clypeus short; borders of cheeks nearly straight. Pronotum short, about twice as long as the vertex. *Genitalia: male*, plates somewhat swollen at base, narrowed beyond middle, compressed and a little upturned at tip.

Greenish yellow, deeply tinted with orange or fulvous; vertex, hind border, median line, pronotum, hind border, and indistinct median

line, greenish; elytra sub-hyaline, greenish, deeply tinged with orange; face mostly fulvous; cheeks greenish; ocelli reddish; abdomen fulvous.

Length: 3 mm.

Described from three male specimens, *type* and *paratypes*, one a little more deeply tinted with fulvous than the others, from Province del Sara, Bolivia, 450 M., Nov., 1909, C. M. Acc. No. 4549 (Steinbach *coll.*).

This species approaches *I. fulvus* and *I. ocellatus*, but lacks the dark dots on the elytra, and differs in the color-pattern, as well as the genitalia.

## 22. *Idiocerus rugifrons* sp. nov.

Face, vertex, pronotum, and scutellum minutely rugose; head wider than pronotum, scarcely produced before; vertex broadly sub-angulate; ocelli scarcely farther from each other than from margin of eye; front broad, rounded to clypeus; clypeus contracted at middle; loræ elongate, reaching border of cheek; cheek rather broad, rounded, scarcely sinuate on border. Pronotum short; lateral margin reduced to an angle; hind border truncate; elytra with short oval anteapical cell. *Genitalia: male*, plates narrow at base, divergent, and contracted behind the middle, compressed, rounded and blunt at tip.

Dark olive-green, tip of scutellum brighter green; elytra sub-hyaline, suffused with brownish; cross-vein, base and apex of outer apical, and the apical veins fuscous; lower part of face bright green; thorax dark brown; abdomen and legs lighter brown. Male plates brownish, inner borders greenish with a discal fuscous dot.

Length: 3.5 mm.

Described from one male specimen, *type*, in the author's collection, collected by H. S. Parish, at Bartica, British Guiana, Mar. 20-30, 1901.

This species is near to *Bythoscopus* in shape, but the vertex and pronotum are minutely rugose, instead of striate, and the face agrees better with the species of *Idiocerus*.



## XVI. NEOTROPICAL HOMOPTERA OF THE CARNEGIE MUSEUM.

### PART 4. REPORT UPON THE COLLECTIONS IN THE SUBFAMILY JASSINÆ, WITH DESCRIPTIONS OF NEW SPECIES.

(PLATE LVI, FIGS. 1-3; PLS. LVII-LVIII; PL. LIX, FIG. 2.)

BY HERBERT OSBORN.

In this part of the study upon the neotropical Homoptera in the Carnegie Museum there are presented the results of further work upon the species of the subfamily *Jassinæ*, already to some extent dealt with in Part 2 of this series of papers. There has been a special effort made to identify and place in order the species treated by earlier authors, especially by Stål and by Berg, who in times past have been among the leading contributors to the description of South American species in this subfamily. Allusion has already been made in the preceding paper (*Neotropical Homoptera of the Carnegie Museum*, Part 3) to the fact that the Carnegie Museum has acquired a series of exact drawings of a number of the types of the species named by Stål, which are preserved in the Naturhistoriska Riksmuseet in Stockholm. One of the interesting results of the examination of these figures is the discovery that our common *Euscelis exitiosa* Uhler is *Thamnotettix obscurinervis* Stål, a fact which would not have been surmised from the use of Stål's description alone.

Many of the species in this group, notably *Euscelis obscurinervis*, *Thamnotettix colonus*, and *Deltocephalus flavicosta*, are recognized as serious economic pests in the United States. We may quite reasonably presume that these species have found their way into this country, either by gradual dispersion from the tropical regions, or by introduction through human agencies. There is every reason to expect that other species, especially those which swarm upon the native grasses of the pampas of the upper La Plata and the Amazons, might, if once introduced into North America, become economic pests of great importance. It is therefore a matter well worthy of

our attention to determine what species occur in the neotropical regions, and to learn as much as possible concerning their habits, host-plants, and means of dispersal.

Order **HEMIPTERA** Linnæus.

Suborder HOMOPTERA Latreille.

Family **CICADELLIDÆ** Latreille.

Subfamily JASSINÆ Amyot et Serville.

Genus **XESTOCEPHALUS** Van Duzee.

*Xestocephalus* Van Duzee, Trans. Am. Ent. Soc., Vol. XIX, 1892, p. 298 (*nomen nudum*); Bull. Buffalo Soc. Nat. Hist., Vol. V, 1894, pp. 197, 215.

1. ***Xestocephalus pulicarius*** Van Duzee.

*Xestocephalus pulicarius* Van Duzee, Bull. Buffalo Soc. Nat. Hist., Vol. V, 1894, pp. 197, 215; *ibidem*, Vol. VIII, 1907, p. 62; Vol. IX, 1908, p. 216.

Small, robust; head scarcely as wide as pronotum, rounded in front; vertex one-half longer at middle than next the eye. *Genitalia: female*, last ventral segment twice as long as preceding, truncate, or faintly sinuate; *male*, valve hidden; plates narrow, spine-like, acute at tip, extending to tip of pygofer.

Light brown or fulvous with fuscous and whitish spots; vertex with a central white stripe with a median fuscous line, on each side of which is a quadrate fuscous spot, connected with an anterior broken band, which includes the white-bordered ocelli; elytra with elongated white spots on the veins and two yellowish transparent spots on the costa, the outer one enclosing a fuscous dot.

Length: 2.5 mm. to 3 mm.

This species has been recorded from a wide area, extending from Quebec and Maine to Florida and the West Indies. Van Duzee noted it as occurring in Jamaica.

There are at hand specimens from the Province del Sara, Bolivia, 450 M., Dec., 1918, C. M. Acc. No. 6443, and C. M. Acc. No. 5064, from the same locality; Las Juntas, Bolivia, C. M. Acc. No. 5066 (Steinbach *coll.*). There are also specimens from Taperina and Santarem, Brazil, C. M. Acc. No. 2966 (H. H. Smith *coll.*). The specimens from the last two localities are somewhat darker and a little smaller than the Bolivian specimens, but agree in color-pattern. The species evidently varies somewhat in size and in the distinctness of the light markings, but no more than might be expected in the case of an insect having such a wide range.

## 2. *Xestocephalus superbus* (Provancher).

*Deltocephalus superbus* Provancher, Pet. Faune Entom. Canad., Vol. III, 1890, p. 339.

*Xestocephalus fulvocapitatus* Van Duzee, Bull. Buffalo Soc. Nat. Hist., Vol. V, 1894, pp. 197, 215.

Larger than *X. pulicarius*, with less definite markings, though in part similar; head short, rounded in front; vertex slightly longer at middle than next the eye, about one-half as long as pronotum. *Genitalia: female*, last ventral segment twice as long as preceding, slightly sinuate.

Brown; vertex light brown to yellowish, with faint clouding; face brownish, margin of front darker. Pronotum minutely irrorate; scutellum with black triangles at base; elytra fuscous, with a few light spots on the clavus and subhyaline spots in the outer areoles.

Length: 3.5 mm.

One female specimen from Province del Sara, Bolivia, Dec., 1912, C. M. Acc. No. 5064 (Steinbach coll.) and another female from Don Diego, Dept. of Magdalena, Colombia, 100 ft. above sea-level, C. M. Acc. No. 1999 (H. H. Smith coll.). These agree very closely with North American specimens, and can be separated from *X. pulicarius* mainly by their larger size and the obscure markings of the head and pronotum.

## 3. *Xestocephalus tessellatus* Van Duzee.

*Xestocephalus tessellatus* Van Duzee, Bull. Buffalo Soc. Nat. Hist., Vol. V, 1894, p. 216.

Head narrower than pronotum, rounded in front; ocelli slightly above the margin of the vertex; vertex short, rounded to front; front broad at base, narrowing abruptly to clypeus; clypeus a little longer than broad, sides parallel; loræ rather large, nearly reaching border of cheek; cheeks short, margins slightly sinuate. Pronotum broad, strongly arched in front, hind border scarcely concave. *Genitalia: female*, last ventral segment longer than the preceding, hind margin slightly sinuate; *male*, valve minute or hidden; plates elongate, tapering to acute tips, reaching almost to apex of pygofer.

Light brown, checkered with fuscous and yellowish; head and pronotum light gray, with faint fulvous irrorations. Pronotum with two black dots on the anterior border; scutellum with a black triangle on the basal angles; beneath, face mottled with fuscous and whitish; legs light brown; tibiæ annulate with fuscous.

There are numerous specimens in the collection of the Carnegie Museum, representing several localities: Rio de Janeiro, Brazil, July, 1908, C. M. Acc. No. 3702 (Haseman coll.); Pará, Brazil, Dec. 6,

1907, C. M. Acc. No. 3533 (Haseman *coll.*); Province del Sara, Bolivia, Nov., 1912, C. M. Acc. No. 5064 (Steinbach *coll.*); Don Diego, Department of Magdalena, Colombia, 100 ft. above sea-level, July, C. M. Acc. No. 1999 (H. H. Smith *coll.*).

This is a common species, ranging from as far north as Ohio, and throughout the southern United States, through Mexico, Central America, and South America, to southern Brazil. It shows considerable variation in the tessellation, but, considering its wide range, maintains a fairly uniform appearance.

#### 4. *Xestocephalus brunneus* Van Duzee.

*Xestocephalus brunneus* Van Duzee, Bull. Buffalo Soc. Nat. Hist., Vol. VIII, 1907, p. 62.

Head narrower than pronotum, strongly arched, almost paraboloid in front, nearly as long as pronotum. *Genitalia: female*, last ventral segment nearly twice as long as preceding, sinuate, or slightly notched behind; *male*, valve hidden, plates triangular, narrowing to rather acute points tipped with black.

Darker and richer brown than *X. superbus*, with very faint markings; head, pronotum, and scutellum with scarcely any trace of markings, outer part of elytra with smoky areas, the anteapical and outer apical areoles somewhat hyaline.

Length: female, 3.25 mm.; male, 2.75 mm.

There is a series of specimens taken in the Province del Sara, Bolivia, 450 M., C. M. Acc. No. 5064 (Steinbach *coll.*); one individual from Santarem, Brazil, Dec., 1907, C. M. Acc. No. 4043 (Steinbach *coll.*); and another from Corumbá, Brazil, March, C. M. Acc. No. 2966 (H. H. Smith *coll.*). These specimens agree very closely with the description given by Van Duzee, based upon material from Jamaica and the eastern United States.

#### 5. *Xestocephalus irroratus* sp. nov.

Head narrower than pronotum, rounded, faintly subangulate in front; vertex twice as wide as length at middle, one-third longer at middle than next the eye, rounded to front; front convex, not especially tumid, narrowed abruptly from antennæ to clypeus; clypeus long, twice as long as wide, sides nearly parallel; apex truncate; loræ large, merging with border of cheek; cheeks broad at base, distinctly sinuate below the eye. Pronotum short, about one-half longer than vertex, lateral border rounded, hind angles distinct, posterior border concave; scutellum short; elytra slightly exceeding abdomen. *Geni-*



*talía: female*, last ventral segment short, scarcely twice as long as preceding, hind margin scarcely sinuate, with a distinct shallow notch at the middle.

Dull fulvous, minutely irrorate with brownish, the brown merging into somewhat definite spots on front; clypeus, cheeks, and elytra having some ivory-whitish spots on the disk; costa subhyaline; some fuscous patches on the apical veins.

Length: 3 to 3.25 mm.

This species approximates *X. tessellatus* in size and color, but is much more finely maculate and the ivory-white spots of the elytra are mostly in the areoles and not on the veins.

There are four female specimens, *type* and *paratypes*, in the Museum: one from Province del Sara, Bolivia, 450 M., Dec., 1918, C. M. Acc. No. 4443, and three from the same locality, Feb., 1913, C. M. Acc. No. 5064 (Steinbach *coll.*).

#### Genus NIONIA BALL.

*Nionia* Ball, Proc. Biol. Soc. Wash., Vol. XXIII, 1891, p. 165.

#### 6. *Nionia major* sp. nov.

Robust, larger than *N. gagatina* (*q. v.*). Distinctly punctate; head wider than pronotum, strongly angulate; eyes prominent; vertex very short, a narrow border before the much produced pronotum; front convex, punctate, striate at sides; clypeus tumid on basal part. Pronotum extending forward of anterior border of eyes, densely punctate; scutellum acuminate. Elytra coriaceous, veins margined with series of punctures, outer anteapical open. *Genitalia: male*, plates narrow, elongate triangular, tips acute and nearly reaching tip of pygofer.

Shining blue-black; tips of elytra and hinder abdominal segment brownish; plates light brown.

Length: male, 6 mm.; width, 2.25 mm.

Described from four males in the collection of the author from Chulumani and Coroica Yungas, Bolivia, *type* and *paratypes*; one *paratype* presented to the collection of the Carnegie Museum.

#### 7. *Nionia gagatina* sp. nov.

Similar to *N. palmeri* Van Duzee. Head broad, much produced; vertex very short, scarcely more than a border in front of the anteriorly produced pronotum; front broad, convex, punctate, minutely striate at sides; clypeus slightly swollen at base; pronotum densely punctate, faintly striate; scutellum minutely punctate. Elytra coriaceous,

veins bordered with punctures, outer anteapical open. *Genitalia: male*, plates narrow, triangular, tips acute, upturned, nearly reaching tip of pygofer.

Shining black, faintly bluish; tips of elytra and of femora, tibiæ, and tarsi embrowned. Hind margin of abdominal segment narrowly pale.

Length: 4.8 mm.

The collection of the author includes several male specimens, one labelled as from "Archidona (Ecuador) R. Hænsch.," and six from "Chulumani, Bolivia, Dec. 9, '98." The specimen from Archidona, secured many years ago from a German dealer, bears the label: "*Bythoscopus gagatinus* Bredd." An exhaustive search of the entire literature of the subject shows that no South American species, which could possibly be referred to the genus *Nionia*, has ever been published by Breddin. The only species, to which Breddin has applied the specific name *gagatinus*, is from southern Java, and belongs to the heteropterous genus *Biasticus*. The label on my specimen is therefore evidently a manuscript name, or was written in error by the dealer. Nevertheless I have adopted it for this species.

7a. *Nionia gagatina* var. *brunnea*, var. nov.

Like *N. gagatina* in size and form, but slightly narrower. The elytra, legs, and under side of abdomen brown.

Four specimens from Coroica Yungas, Bolivia, April 16, 1899.

8. *Nionia minor* sp. nov.

Similar to *N. major* and *N. gagatina*, but much smaller. Head broad, angulate; vertex very short; front convex, punctate; clypeus convex; pronotum coarsely punctate and faintly transversely striate, or rugose; scutellum acuminate, minutely punctate; elytra coriaceous, veins bordered with punctures, outer anteapical open, or with trace of terminal cross-vein. *Genitalia: male*, plates narrow, triangular, tips acute and reaching nearly to tip of pygofer.

Shining black, faintly bluish; tibiæ and tarsi embrowned.

Length: male, 5.5 mm.

Except for size, this species is close to *N. gagatina*. It is very similar to our North American *N. palmeri* (Van Duzee), with which it agrees in size and form, but from which it differs in the shorter apical part of the vertex and the longer, more acute male plates.

9. *Nionia postica* (Stål) (Plate LVI, fig. 3).

*Bythoscopus posticus* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 54.

Stål's Latin description of this species reads as follows:

"Subdepressus, niger, tegminum opacorum apicibus sordide testaceo-flavo-hyalinis; limbo dorsali abdominis, apicibus femorum, tibiis tarsisque flavo-testaceis. ♂. Long. 4, Lat. 1.5 Millim.—(Mus. Holm. et Stål).

Species insignis, subdepressa. Caput vertice sat brevi, fronte admodum reclinato-decliva, subtiliter coriacea. Thorax longitudine plus duplo latior, anterieus rotundato-productus, subtiliter transversim rugosus. Scutellum subtiliter rugosum, thorace tertia parte brevius. Tegmina opaca, venis (partis apicalis exceptis) utrimque distincte punctatis."

From this description I have been led to feel that *B. posticus* Stål must be referred to the genus *Nionia*, together with *B. gagatina*, even if these species may not perhaps be identical. The figure, drawn by Madame Eklblom from the type in the Museum at Stockholm, clearly shows that the species falls into the genus *Nionia*, but the much longer vertex, as shown in the drawing, does not confirm its identity with *N. gagatina*.

The figure brings out the punctate characters and the much produced head, the prothorax extending even with the front border of the eyes, and the form of front, clypeus, and the male plates corresponding closely with these parts in other species of *Nionia*. The male plates are larger and appear to extend beyond the tip of the pygofer; the scutellum is shorter, not acuminate, and the outer anteapical appears to be closed by a cross-vein.

As compared with the other species Stål's statement "*Caput vertice sat brevi*" is not distinctive, since in other species the vertex is reduced to a very narrow margin in front of the pronotum.

## Genus DICYPHONIA Ball.

*Dicyphonia* Ball, Proc. Iowa Acad. Sci., Vol. VII, 1900, p. 69.

10. *Dicyphonia picturata* sp. nov.

Head a little narrower than pronotum; vertex scarcely as long as width between the eyes, twice as long at middle as next the eye; disk with broad depression; front broad at base, narrowing from eyes to clypeus, distinctly convex; clypeus long, twice as long as width at



base; apex slightly widened; loræ almost reaching margin of cheeks; cheeks rather broad, slightly sinuate from hind margin of eye. Pronotum strongly arched in front, emarginate behind, nearly one-half longer than vertex; lateral margins carinate; clavus with numerous cross-veins; costa with about seven oblique cross-veinlets. *Genitalia*: *male*, valve long, obtusely angular; plates broad at base, narrowed to the blunt, slightly upturned tips, reaching the apex of pygofer; margins of pygofer thickened, with short bristles at apex.

Black and ivory-white; vertex black, with borders of ivory-white; face with two black bands at base of front, and a large V-shaped black mark, extending from lower border of eyes on outer margin and apex of front, inner margin of cheek and all of clypeus; a large triangular spot on front and the loræ, ivory-white. Pronotum, with anterior, discal, and lateral areas, black; a middle and posterior band, and lateral margin, whitish; scutellum black, with a transverse spot and the apex ivory-white; elytra milky-white or subhyaline, with the veins and cross-veins densely fuscous, or blackish; thorax black with ivory margin; legs whitish; hind femora and tibiæ, except the knees, blackish. Abdomen black; margins of basal segments and the apical part of pygofer yellowish.

Length: male, 3.5 mm.

Described from a single male specimen, *type*, in the collection of the author, from Coroico Yungas, Bolivia, April, 1899.

#### Genus *HULERIA* Ball.

*Hulëria* Ball, Canadian Entomologist, Vol. XXXIV, 1915, p. 167.

#### 11. *Hulëria rugosa*, sp. nov.

Head about equal to hind part of pronotum in width; distinctly produced, the borders elevated and apex porrect; vertex nearly as long as width between the eyes, three times longer at middle than next the eye, strongly rugose, two ocellus-like spots near the eye; ocelli on border between vertex and front, about one-fifth the distance from eye to tip; front broad between antennal pits, narrowing uniformly to base of clypeus, strongly rugose, clypeus enlarged toward the tip, twice as long as width at base; apex truncate, minutely rugose; loræ long, distant from edge of cheek, rugose; cheeks broad, deeply sinuate below the eye, with rugosities arranged in three different series. Pronotum one-fourth longer than vertex, sloping forward; anterior border strongly arched, hind border distinctly concave; the anterior half rugose and pitted, the hind part coarsely, transversely striate; scutellum with the central areas longitudinally rugose; clavus with two veins connected by a transverse veinlet; elytral veins elevated; apical veins four, and in some cases apparently



with the indistinct veinlet forming a fifth vein at end of costa. *Genitalia: male*, valve small, inconspicuous; plates broad at base, narrowing very abruptly and extended as compressed, tips slightly upturned to near the end of the pygofer; pygofer compressed.

Vertex blackish, except at the border; pronotum brown, somewhat infuscated at the middle of the anterior part and greenish at the sides; scutellum olive-green, the central areas, two dots on the anterior margin, and a dot on each side on the lateral margin, and the suture, fuscous; elytra brown, some of the nervures a little lighter; the costa blackish. Beneath, dark olive-green; pleural pieces, bases of anterior and middle femora, and an indistinct band near the tips, the tips of the tibiae and the tarsal claws, fuscous, or blackish; abdomen with a series of dark patches on the outer part of the ventral segments.

Length: male, 8 mm.

Described from twenty-eight specimens, all males, from Coroico Yungas, Bolivia, April 16, 1899, in the author's collection. *Type* and *paratypes* in the collection of author, Ohio State University; *paratypes* in the Carnegie Museum, Pittsburgh, Pa.; U. S. National Museum, Washington, D. C.; and the American Museum of Natural History, New York City.

The prevailing color is brown, varied with fuscous and greenish; olive-green below; head slightly curved upward; face, vertex, and anterior part of pronotum, strongly rugose; posterior part of pronotum, disk of scutellum, and pleural pieces, finely rugose, or striate.

## 12. *Huleria affinis* sp. nov.

Shape of head, and rugose surfaces similar to those of *H. rugosa*. Clypeus narrowed at the middle; apex broadened, truncate. *Genitalia: male*, valve minute, or concealed; plates narrowed abruptly at base, tapering to tips, which are somewhat compressed, rounded, and nearly as long as the pygofer.

Vertex black, with lighter patches on the hind border. Pronotum olive-green with a few fuscous dots, especially in the pits of the anterior part; scutellum with the disk fuscous and the apical part green; elytra brown with the veins lighter; costa dark, beneath greenish yellow; anterior and middle femora fuscous to beyond the middle; tips of tibiae and tarsal claws dusky; abdomen greenish, tinged with yellow.

Length: 6.5 mm.

Described from a single male specimen, *type*, in the collection of the author, from Chulumani, Bolivia, taken Dec. 9, 1898.

Similar to *H. rugosa*, but smaller and differing in color and in the genitalia. While it is possible that intermediate forms may connect this with *H. rugosa*, there seems too much difference to place it in that species without additional material. Moreover the full series of *H. rugosa* shows no tendency to variation in the direction of *H. affinis*.

Genus SCAPHOIDEUS Uhler.

*Scaphoideus* Uhler, Trans. Maryland Acad. Sci., Vol. I, 1889, p. 33.

13. *Scaphoideus fasciatus* Osborn.

*Scaphoideus fasciatus* Osborn, Jour. Cinc. Soc. Nat. Hist., Vol. XIX, 1900, p. 190.

*Scaphoideus fasciatus* Van Duzee, Bull. Buffalo Soc. Nat. Sci., Vol. VIII, 1907, p. 69.

*Scaphoideus fasciatus* Osborn, Ohio Naturalist, Vol. XI, 1910, p. 252.

Head wider than pronotum, obtusely angulate; vertex about one-third longer at middle than next the eye; margin subacute; front broad, narrowing to base of clypeus; clypeus long; loræ distant from margin of cheeks. Pronotum strongly arched in front, truncate behind; lateral margins very short; elytral appendix narrow. *Genitalia: female*, last ventral segment somewhat concavely excavated, slightly prominent at the middle; *male*, valve short; plates oval, short, one-half as long as pygofer, bluntly rounded at apex with a discal brown fascia, as described from Haytian specimen.

Ivory-white; vertex with obsolete pair of dots near apex; faint fuscous spot on the disk; face white with two marginal bands above; a band between lower part of eyes, including antennal pits and a band across clypeus, loræ and lower border of cheek, fuscous. Pronotum with fuscous points on anterior border; a larger patch behind the eye, the basal angles of scutellum, a cruciate patch on elytra, and a darker border, fuscous; the hinder part of the cruciate mark is reduced at the middle, the distinct darker border separating it from a lighter patch, beyond which next to costa is a darker oblique patch; the veins toward apex fuscous; the first and fourth apical areoles, hyaline; second and third more or less infuscate; legs whitish; femora annulate or largely fuscous.

Length: 4.5 mm.

A single female specimen from Bahia, Brazil, March, 1908, C. M. Acc. No. 3529 (Haseman coll.) is referred to this species, although slightly larger than the female type, with which it has been compared. It is evidently nearly related to *S. ornatipennis* Stål (see Pl. LVII, fig. 2) but that species has the base of the scutellum black, the dots of the vertex more distinct, and the pattern of the cruciate mark is shown as having continuous bars reaching the costa and a large shield-like white mark within the cross on the suture. There is also

some difference in the frontal markings, this species having the marginal white line at base of the front continuous. These species are closely related to *S. neglectus* and *S. cruciatus* of the Atlantic and Gulf Coast of the United States; and it is possible that with sufficient material it might be possible to connect all into a single species with geographic variations. I also have specimens referred to *S. fasciatus* from Guatemala.

#### 14. *Scaphoideus ornatipennis* (Stål) (Plate LVII, fig. 2).

*Jassus* (*Deltocephalus*) *ornatipennis* Stål, *Eugenies resa*, Ins. Hemipt., 1858, p. 294.

The original description given by Stål is as follows:

"Pallide sordide griseo-flavescens; frontis margine basali, fascia intraoculari aliaque mox infra oculos supra genas utrimque continuata, maculisque femorum nigricantibus; tegminibus pellucidis, fasciis 2, una media, altera mox ante medium sita subobliqua, in tegminum disco confluentibus, flavo-testaceis, fusco-marginatis, maculam communem commisuralem aliamque costalem subdecolores inter se relinquentibus; areolis apicalibus fusco-limbatis. ♀. Long. 3.5-4.5, Lat. 1-1.5 millim.

Patria: Callao, Puna.

Eximia species, secundum exempla in spiritu asservata descripta. Caput subobtuse triangulare, vertice medio quam utrimque ad oculos dimidio longiore, basi oculo singulo vix latiore, thorace paullulum brevior.

The species is well marked by the elytral design, and evidently is closely related to *S. fasciatus* Osborn, described from Hayti. From the description it is smaller and the figure of the type indicates differences in the color-pattern. The geographical records cover quite different regions. No specimens, which seem to be clearly referable to this species, have been seen by me.

#### Genus DELTOCEPHALUS Burmeister.

*Deltocephalus* Burmeister, *Genera Ins.*, Vol. I, 1838, Pl. 14, subgen. 3.

#### 15. *Deltocephalus flavicosta* Stål

*Jassus* (*Deltocephalus*) *flavicosta* Stål, *Bidrag till Rio Janeiro-Traktens Hemipter-fauna*, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 53.

Head slightly wider than pronotum; vertex one-third longer than next the eye, slightly wider between eyes than length at middle; front tapering to clypeus; clypeus longer than wide, narrowed toward tip; loræ not reaching margin of cheek; cheek margin nearly straight.



Pronotum slightly longer than vertex, rounded in front, scarcely sinuate behind; posterior borders broadly rounded; scutellum very small, not as long as pronotum, about as long as the vertex; elytra somewhat longer than body. *Genitalia: female*, last ventral segment rather short, concave behind; the margin thickened and faintly notched; *male*, valve rounded behind; plates short, tapering nearly uniformly to acute tips.

In the darker forms, dark fuscous or blackish with six yellow dots on the vertex, a dot at the extreme tip of vertex, ocelli and a dot next the eye, short arcs and a central disk on the front and the costal border of elytra yellow; two whitish oblique spots toward the tip of the wing; beneath black; legs, borders of the abdominal segments have a patch on the pygofers pale. In the paler forms the color above is brownish; elytral veins whitish, bordered with fuscous; vertex brown instead of black, but the yellow dot on vertex in front and the yellow border of elytra agree with those of the darker form.

This is a common insect distributed all the way from southern South America to the northern United States. It seems most probable that it has spread northward from a tropical habitat. The specimens in hand are from Bahia, Brazil, 1907, C. M. Acc. No. 3441; San Antonio, Rio Guaporé, July and August, 1909, C. M. Acc. No. 4043 (Haseman *coll.*). One of these specimens bears the record, "sweeping on island in Rio Guaporé." The above are light-colored forms. Three specimens from Province del Sara, Bolivia, Nov. and Dec., 1912, C. M. Acc. Nos. 5043 and 5064, and one Dec., 1918, C. M. Acc. No. 6443 (Steinbach *coll.*).

Many other specimens have been seen from various South American localities, and the species is, no doubt, very generally distributed, probably in grassy areas. The specimens above listed seem quite clearly to fall into two varieties: the Brazilian specimens, which are light; and those from Bolivia, which are dark. However these variations are in general not associated with geographic distribution.

16. ***Deltocephalus lepidellus* Stål.** (Plate LVII, fig. 1).

*Jassus (Deltocephalus) lepidellus* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 53.

A free rendering of Stål's original description is here inserted:

'Pale, sprinkled with fuscous and brown spots; elytra dull yellow-testaceous; the swollen veins and costal border (base excepted) whitish; areoles narrowly margined with fuscous; the entire outer apical cell and costal spot near middle, fuscous; femora black-spotted. Male, length 4 mm.; width, 1.25 mm.



Related to *D. ocellaris* and *D. formosus*. Head bluntly triangularly rounded; the vertex a trifle longer than the basal width; two small black spots close together at apex, and behind these two large irregular yellow-testaceous spots; front with transverse fuscous lines; cheeks and loræ spotted with fuscous. Thorax somewhat longer than vertex, yellow-testaceous, whitish behind, in front with small fuscous spots. Scutellum pale, angles yellow-testaceous. Elytra somewhat surpassing the abdomen, apex broadly and obliquely rounded; veins swollen, whitish; the discoidal and inner areoles yellow-testaceous, narrowly and irregularly margined with fuscous. Four apical areoles, middle uncolored, margined with fuscous; costal margin (base excepted) hyaline. Fuscous spot at middle, behind the spot two transverse veins, between spot and exterior apical areole three small squarish areoles. Abdomen black, border yellow. Feet pale yellowish, femora broadly ringed with black.'

The figure of this species, drawn by Madame Ekblom from Stål's specimen, shows a female instead of a male, the sex given to the type in the original description; however, the figure agrees well with the description, and presumably is that of a female, which accompanied the male which was described. It shows the species to belong to the group with divided middle anteapical areole and two cross-nervures, as in *T. shermani*. It is very similar to the species described below as *T. venatus*, differing in its broader form and somewhat different appearance, as delineated.

17. ***Deltocephalus anticus*** Stål. (Plate LVIII, fig. 4).

*Jassus (Deltocephalus) anticus* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 53.

The original description given by Stål may be paraphrased as follows:

Pale fuscous-testaceous, base of femora more obscure. Vertex, thorax, scutellum, and scutellar border of clavus yellowish; elytra at costa with oblique fuscous lines, toward apex with minute white hyaline spots. ♀. Length: 4.25 mm.; width 1.25 mm.

Head angularly produced, vertex flattish, forming an acute angle; base between eyes one-third of length, almost equal to single eye. A faint evanescent impressed longitudinal line toward apex; face strongly oblique, thorax somewhat shorter than head, two and one-half times wider than long, rounded in front; scutellum barely as long as thorax; elytra much longer than abdomen, valve at apex broadly rounded, fusco-testaceous-hyaline obscurely veined, apical areoles at base and discoidal at claval apex with minute white hyaline spots.

We have not seen specimens, which answer to this description or the figure of the type, but the above translation, together with the figure of the type, should readily enable it to be recognized. It has apparently something of the character of *Platymetopius*, especially in the narrow front and the costal veinlets.

18. ***Deltocephalus marginelineatus*** Stål. (Plate LIX, fig. 2).

*Jassus (Deltocephalus) marginelineatus* Stål, *Eugenies resa*, Ins. Hemipt., 1858, p. 294.

The original Latin description of this species is here inserted:

"Pallide sordide flavo-testaceus, supra fusco-adspersus et irroratus, facie flavo-albida; capite triangulari, latitudine basali nonnihil longiore; tegminibus fascia lineari subapicali fusca, apice imo pallidior, areolis (costali transversim oblique fusco-lineata excepta) minutissime fusco-irroratis, disco macula singula parva albida notatis. ♀. Long. 4, Lat. 1.25 millim.

Patria: Rio Janeiro.

Caput latitudine basali nonnihil longius, oculis supra visis oblongis; vertice latitudine basali dimidio longiore, levissime concaviusculo, apice lineola, prope apicem lineolis 4 longitudinalibus pallidis ornato; fronte valde reclinato-decliva. Thorax vertice tertia parte brevior. Tegmina abdomen superantia, minute fusco-irrorata, margine costali fusco-lineato areolarumque macula minuta media albidis. Pectus fuscum, limbo incisurisque tenuiter flavescentibus."

This description may be paraphrased as follows:

'Pale dull yellow-testaceous; dotted and sprinkled above with fuscous; face yellow-whitish; head triangular, somewhat longer than its basal breadth; the elytra marked by a fuscous subapical linear band, at the apex decidedly paler; the areoles very finely sprinkled with fuscous, all (except the costal areole, which is marked by transverse oblique fuscous lines) having on the disk a single small white spot. ♀. Length, 4 mm., width, 1.25 mm.

*Habitat*: Rio Janeiro.

Head somewhat longer than its width at base, the eyes, viewed from above, oblong; vertex one-half longer than its basal width, very slightly inclining to become concave, ornamented at the apex with a fine line, and near the apex by four longitudinal fine lines, all of these lines whitish; front sloping backward and downward. Thorax one-third shorter than vertex. Elytra surpassing the abdomen, minutely irrorate with fuscous, the costal margin marked with fuscous lines, and a minute whitish spot in the middle of the areoles. The pectus fuscous, on the border and the sutures faintly yellowish.'

This species is evidently a *Platymetopius*. It is near *P. loricatus* Van Duzee. A specimen from Bartica, British Guiana, in the collection of the author, is identified as undoubtedly being it.

19. ***Deltocephalus faminei* Stål.** (Plate LVI, fig. 2).

*Jassus (Deltocephalus) faminei* Stål, *Eugenies resa*, Ins. Hemipt., 1858, p. 293.

The original description by Stål is here reproduced:

"Pallide flavescens; verticis maculis 2 parvis posterioribus, linea utrimque media transversa lineisque apicalibus suboblique transversis, cum margine antico parallelis, fronte (lineolis lateralibus transversis mediaque longitudinali exceptis), macula clypei apicali, limbo lororum, pectore abdomineque (exceptis incisuris), maculis femorum punctisque tibiæ nigris; tegminibus sordidis, pallide subsordide flavescente-venosis, areolis fusco-marginatis. ♂, ♀. Long. 3.5-4.5; Lat. 1.25-1.66 millim.

Patria: Patagonia (Port Famine).

Variat tegminibus pallidioribus, areolis vix fusco-limbatis.

Statura fere *J. striatuli*, major. Caput obtuse triangulare, vertice medio quam utrimque ad oculos fere duplo longiore, thoraci æquilongo, oculo dimidio latiore; facie valde reclinato-decliva, fronte convexiuscula. Thorax longitudine fere plus duplo et dimidio latior. Tegmina abdomen paullulum superantia, venis distinctis, areolis apicalibus a commisura extrorsum sensim magnitudine decrescentibus."

The first part of the above description may be paraphrased as follows:

Pale yellowish; two small spots at the back of the vertex, a median transverse line on either side and somewhat oblique transverse apical lines parallel with the anterior margin, the front (transverse lateral fine lines and a longitudinal median line excepted), an apical spot on the clypeus, the margin of the loræ, the pectus and the abdomen (the sutures excepted) spots on the femora and dots on the tibiæ, black; the elytra sordid, the veins pale somewhat sordid yellowish, the areoles bordered with fuscous. Male and female. Length: 3.5-4.5; width, 1.25-1.66 mm.

*Habitat*: Patagonia (Port Famine).

A series of specimens in the collection of the author taken in the Canal Zone agrees well with the description of Stål and the figure of the type and is referred to this species. It evidently has a wide range from Patagonia northward.



## Genus EUSCELIS Brullé.

*Euscelis* Brullé, Expédition Scientifique de Morée, Vol. III, pt. I, 1832, p. 109 (?).

20. *Euscelis obscurinervis* (Stål) (Plate LVII, fig. 3-4).

*Jassus* (*Thamnotettix*) *obscurinervis* Stål, Eugenies resa, Ins. Hemipt., 1858, p. 293.

*Cicadula exitiosa* Uhler, Am. Entom., Vol. III, 1880, p. 72.

*Limotettix exitiosa* Van Duzee, Psyche, Vol. V, 1892, p. 306.

*Eutettix exitiosa* Gillette and Baker, Hemip. Colorado, 1895, p. 100.

*Athysanus exitiosa* Osborn and Ball, Ohio Naturalist, Vol. II, 1902, p. 234.

*Euscelis exitiosa* Van Duzee, Catalog. Hemip. North of Mexico, 1916, p. 655.

The Latin description given by Stål may be repeated here for the benefit of those who do not have access to the original:

"Valde pallide griseo-flavescens; fascia sæpe obsoletissima media verticis, utrimque ramulum retrorsum et introrsum currentem semper distinctum emittente, maculis 2 basalibus, puncto interdum basali medio, lineola media longitudinali lineolisque transversis lateralibus frontis, vitta clypei, maculis lororum genarumque, maculis nonnullis anterioribus parvis distinctis, interdum etiam maculis 2 majoribus, transversis, obsoletis pone medium thoracis, maculis basalibus prope angulos interdum retrorsum ad vittulas subarcuatas extensis, sæpe etiam maculis 2 minutis mediis scutelli venisque tegminum, pectore fere toto (exceptis incisuris plus minus late) abdomine (limbo incisurisque exceptis) lineisque femorum fuscis aut nigro-fuscis. ♂, ♀. Long. 4-5.5, Lat. 1.5-1.66 millim.

Patria: Buenos Ayres, Rio Janeiro.

Caput inter oculos latiuscule rotundatum, vertice medio quam utrimque paullulum longiore, longitudine sua fere duplo, oculo singulo vix duplo latiore; fronte nonnihil reclinato-decliva. Thorax vertice fere duplo longior, longitudine duplo et dimidio latior. Tegmina valvata, venis mediocribus, areolis apicalibus 4, a commisura extrorsum longitudine decrescentibus, 2 exterioribus subæquilongis."

Head wider than pronotum; vertex broad, three times as wide as length at middle, scarcely longer at middle than next the eye, faintly subangulate; front broad, slightly longer than width; loræ short, not reaching margin of cheek; margin of cheek sinuate. Pronotum twice as wide as long and twice the length of the vertex, anterior border much curved, hind border slightly concave; scutellum nearly as long as pronotum; elytra mostly hyaline, with conspicuous venation. *Genitalia: female*, last ventral segment truncate; *male*, valve short, rounded behind; plates elongate, rather slender, tapering to acute upturned tips.

Light gray; the vertex with a transverse fuscous band, with two oblique dark fuscous spots, the inner ends nearly touching the hind border; base of front with two large roundish, blackish spots, almost touching the ocelli; the arcs and a central line in the apical portion



brownish fuscous; face otherwise whitish. Pronotum with a series of four black dots near the anterior border; the scutellum with two black triangles on the base; elytra with dark fuscous or blackish veins; the apex smoky.

Length: male, 4 to 4.5 mm.; female, 5 mm.

The species is represented in the Carnegie Museum by specimens from Chapada, Brazil, taken in May, C. M. Acc. No. 2966 (H. H. Smith *coll.*) and from Bahia, Brazil, taken in Nov., 1907, C. M. Acc. No. 3441 (Haseman *coll.*).

The species has a very wide distribution in the Western Hemisphere. Specimens have been examined from nearly all parts of the United States, Cuba, Porto Rico, Barbados (Stoner Collection), Central America, Brazil, and Argentina.

The drawings of the types of *J. obscurinervis* by Madame Ekblom reveal to our surprise, as has been already noted, that this species is the same as *E. exitiosa* Uhler, which therefore falls into the synonymy. It is not strange that the species has not hitherto been recognized from Stål's description, especially as the name seems to indicate that the venation is obscure, whereas it is very conspicuous. In the drawings reproduced upon the plate the vertex in the case of the female is more angulate than in the average run of specimens, and the plates of the male genitalia, while of the usual form, are shown as more divergent than in any specimens observed by me, but this may easily be explained as being due to an accidental slight pressure or displacement of these parts.

In the United States *E. obscurinervis* is especially destructive to grasses and cereal crops. It is probably a native of South or Central America and has migrated to the West Indies, the United States, and northward. *Euscelis capicola* Stål of South Africa suggests a common origin for these two species, with a separation of the African and South American forms at some remote time, possibly dating back to the supposed period of continental connexion between Africa and South America.

## 21. *Euscelis palliditarsis* (Stål) (Plate LVIII, fig. 3).

*Jassus (Athysanus) palliditarsis* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 52.

The brief description given by Stål may be translated as follows: 'Black, shining; many lines on vertex and base of front and minute marginal spots on scutellum, dull luteous. Elytra paler at apex, with

a white hyaline costal spot toward apex, areoles narrowly margined with dull pale. Anterior tarsi entirely, hind tarsi at base, pale. Male, length, 4.5 mm.; width, scarcely 2 mm.—(Stockholm Mus. and Collection of Stål).

Head short, vertex arcuate, middle and sides equally long, with base of front marked by alternating dark, testaceous, and dull pale lines. Cheeks and loræ with narrow yellow-testaceous margin. Thorax two and one-half times as long as vertex, with minute pale irrorations. Scutellum with seven marginal spots, one in each angle, two on front margin, and one on each side, also sometimes with small dull luteous or yellowish red spots in the middle. Elytra passing abdomen, apex pale, costal spot toward apex, and apical border, hyaline whitish; areoles narrowly pale-margined.'... *Genitalia: male* (as shown by the figure received from Madame Ekblom) with narrow valves, rounded behind; plates with convex margin and acute tips.

This species has not been seen by me, but is evidently well marked, and the figure (Pl. LVIII, fig. 3) should make its recognition an easy matter.

#### Genus EUTETTIX Van Duzee.

*Eutettix* Van Duzee, Psyche, Vol. VI, 1892, p. 307.

#### 22. *Eutettix mimicus* sp. nov.

Head wider than pronotum, distinctly produced; vertex one-half longer at middle than next the eye, scarcely one-half as long at middle as between the eyes at base, broadly sub-angulate, rounded to the front; front broad, somewhat tumid; clypeus short, scarcely longer than width at tip; loræ sub-quadrate, as long as clypeus; cheeks rounded, margin reflexed. Pronotum strongly arched in front, nearly straight behind, about one-third longer than vertex; scutellum large, as long as pronotum; elytra broad, rounded at tips with rather broad appendix; a broad veinlet at base and tip of outer anteapical. *Genitalia: male*, valve very short, scarcely visible; plates short, broad at base, narrowed abruptly to rounded tips, about one-half the length of the pygofer, which is compressed, and bears a number of stiff hairs.

Ivory-whitish, marked with brown and fuscous; vertex ivory-white, the disk with a black double curved spot, two large dots close to the apex, a black dot next to the eye, just above the ocellus; a series of alternating black and white dots on the inner margin of the eye; the front olive-gray, with short whitish arcs and a whitish line at the center; clypeus and loræ yellowish, bordered with fuscous; cheeks fuscous, with a pale patch behind the border. Pronotum gray, irrorate with fuscous, merging into a rather indistinct band

near the front border; scutellum ivory-whitish with two basal brown spots bordered with fuscous; elytra gray, sub-hyaline; veins fuscous; discal cells with central fuscous spots; costa with a central fuscous spot, two broad veinlets from the outer-anteapical cell, the central apical cell, fuscous; inner cells small, somewhat smoky; legs light brownish; hind border of abdominal segments, margin of the connexivum, and larger part of the male plates, yellowish.

Length: 4 mm.

One male specimen, *holotype*, Province del Sara, Bolivia, Feb., 1913, C. M. Acc. No. 5064 (Steinbach coll.).

This species has a striking superficial resemblance to *Scaphoideus fasciatus*, Osborn, and to *Deltocephalus limicolus*, Osborn, but structurally it falls into the genus *Eutettix*. Moreover, the details of the color-pattern differ distinctly from the species just mentioned.

### 23. *Eutettix reticulatus* sp. nov.

Form of *E. irroratus*, but much smaller; head wider than pronotum, strongly arched, sub-angulate in front; vertex with a distinct transverse depression before the middle, more than twice as wide as length at middle, slightly longer at middle than next the eye, obtusely angular to front; front broad, short rather sharply narrowed below antennæ; clypeus broad, slightly elevated on the disk, tip truncate; loræ large, nearly reaching border of cheek; margin of cheek deeply sinuate beneath the eyes, lower border nearly straight. Pronotum twice as long as vertex, slightly concave behind; clavus and sub-claval areole with numerous cross-veins giving a reticulate appearance to the elytra. *Genitalia: female*, last ventral segment twice as long as preceding, lateral angles rounded; hind border slightly produced at middle.

Brownish, marked with fuscous; vertex pale brown with fulvous spots on the disk, two minute fulvous dots between the ocelli, a small fuscous dot over each ocellus. Pronotum light brown, irrorate with fuscous; scutellum yellowish with fulvous spots on each side at base and fuscous dots in basal angles on the disk and at the margins toward the apex; elytra sub-hyaline, veins and areolar spots fuscous, about four broad cross-veins on outer part of costa, apical margins fuscous; abdomen pale yellowish above, with basal bands of black. Beneath, dark fuscous or blackish; front brown with disk of lateral arcs fuscous; clypeus blackish; cheeks and loræ light yellowish with



fuscous areas; thorax blackish; femora, except at tips, dark fuscous; fore and middle tibiæ light brown; hind tibiæ fuscous, with light brown margins interrupted with black; hind tarsi at tips, tips of joints, and claws blackish; ventral segments blackish at base, with narrow yellowish border; the last ventral segment yellowish, tinged with fuscous; pygofers fuscous with yellowish margins and setæ.

Length: 5 mm.

Described from one female specimen, *holotype*, Bonda, Colombia, July, 1898, C. M. Acc. No. 1999 (H. H. Smith *coll.*).

This is a well marked species belonging in the group with *E. irroratus*, and distinguished by the numerous cross-veins and the small size.

#### Genus ACINOPTERUS Van Duzee.

*Acinopterus* Van Duzee, *Psyche*, Vol. VI, 1892, p. 308.

Recognized by the short rounded head, with the vertex short and rounded to front, and especially by the acutely pointed elytra, which narrow from the middle with the costal border curved, while the inner border is straight. The type of the genus is *Acinopterus acuminatus* Van Duzee.

#### 24. *Acinopterus acuminatus* Van Duzee.

*Acinopterus acuminatus* Van Duzee, *Psyche*, Vol. VI, 1892, p. 308.

(For additional synonymic references consult Van Duzee, *Catalogue of the Hemiptera of America North of Mexico*, p. 675.)

Dark gray or brownish, often greenish, especially in fresh specimens; elytral veins more or less margined with fuscous.

Represented in the Carnegie Museum by specimens from Bonda, Colombia, July, 1898, C. M. Acc. No. 1999 (H. H. Smith *coll.*).

The South American specimens, which are referred to this species, reveal a range of variations similar to that shown by North American forms, two of which have been designated as varieties by Ball:

Var. *brunneus*, brown, or brownish, with veins distinctly infuscated;

Var. *viridis*, green, or greenish, with veins rather faintly infuscated.

From the general neotropic distribution of the species and the fact that its occurrence in the United States was not recorded until 1892, it is probably a tropical or sub-tropical form, which has spread northward, until now it covers most of the United States.



Genus *THAMNOTETTIX* Zetterstedt.*Thamnotettix* Zetterstedt, Ins. Lapponica, 1840, Column 292.25. *Thamnotettix altus* sp. nov.

Head as wide as pronotum; vertex broad, rounded in front, scarcely longer at middle than next the eye; front narrowing gradually from below the eye; clypeus nearly twice as long as wide, widening toward the apex; loræ narrow, not reaching border of cheek; outer border of cheek distinctly sinuate. Pronotum twice as long as vertex, slightly emarginate behind; elytral veins distinct; claval veins not connected by a cross-vein. *Genitalia: male*, valve small, sub-angulate or rounded behind; plates broad, tapering slightly toward broad upturned tips, sparsely set with short bristles.

Vertex light brown or fulvous, with curved band on the disk, connected at ends with a marginal fuscous border, extending slightly beyond the red ocelli; a fuscous picture on the face, including margins of the front, the short transverse arcs and the central patch, including a narrow yellowish line, inner border of cheeks, and loræ black; clypeus brown with tip blackish; outer portion of cheeks dull yellow. Pronotum brown, with the anterior border blackish; the hind portion of the disk irrorate with fuscous; scutellum with large basal triangles, two large dots on the disk, and a spot on each side within the border, fuscous; disk and middle part of apex fulvous; lateral borders yellowish; elytra sub-hyaline, with coppery metallic tints; the veins dark fuscous; thorax light-brown; legs brownish, the posterior pair striped with black; tibiæ with brown spines. Abdomen black; hind margins of segments and connexivum below, and the genital plates, dull yellowish.

Length: 5 to 6 mm.

Seven male specimens in author's collection; three from Coroico Yungas, Bolivia, April 16, 1899; and four specimens from Chulumani, Bolivia, Dec. 9, 1898. This is a very well marked species, apparently related to *Thamnotettix serius* Stål, but with a very different picture on the vertex and face, and it also is much smaller. *Type* and *para-type* in collection of author; *paratypes* in the Carnegie Museum and the United States National Museum.

26. *Thamnotettix serius* Stål. (Plate LVIII, fig. 2).

*Jassus* (*Thamnotettix*) *serius* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 52.

Blackish; front with lines in each side; small spot below eyes on cheek; basal spots on vertex often transversely confluent; thorax in front, scutellum, four small basal spots, apical half, and also pectus,

pale dull reddish yellow. Thorax in front irrorate, or bimaculate with black. Elytra and feet fuscous-testaceous. Veins of elytra beyond the middle, and intra-costal stripes, and tibial spines, white. Length, 8 mm.; width, 2 mm.; Var. with feet paler.

Head obtuse, broadly rounded; vertex margined; parallel; nearly three times wider than long; thorax anteriorly rounded, transversely lightly rugulose, nearly three times longer than vertex; elytral veins toward apex obsolete. (From Stål's original description).

The male genitalia, as shown by the figure, have the valves angular behind, and the plates broad; outer margin rounded, the tips contracted.

No specimens, which can be referred to this species, have been seen in the collections of the Carnegie Museum, but the larger part of the material examined has been from the interior basin of the Amazon, while this species was described from Rio de Janeiro. The above description based upon Stål's Latin diagnosis, with the excellent figure by Madame Ekblom, should make the identification easy.

27. **Thamnotettix luctuosus** Stål. (Plate LVI, fig. 1).

*Jassus* (*Thamnotettix*) *luctuosus* Stål, *Eugenies resa*, Ins. Hemipt., 1858, p. 292.

The original description given by Stål, as cited above, is here reproduced:

"Nigricans, vel nigro-fuscus; margine basali verticis, vitta clypei, loris (macula excepta), genis extus, linea longitudinali media, maculis 2 anticis parvis lineolaque subcurvata utrimque antico-laterali thoracis, vitta clavi ad suturam, lineola longitudinali corii prope basin venaque ad suturam clavi, nec non fronte pallide flavescentibus, hujus maculis 3 basalibus, linea longitudinali media, vittaque utrimque (e lineolis transversis) supra medium cum opposita convergente et cum eadem maculaque basali media confluyente, nigro-fuscis; corii limbo costali ultra medium decolore, hyalino. ♂, ♀. Long. 4.66, Lat. 1.5 millim.

Patria: California, Punà, Taiti.

Variat colore nigro in capite thoraceque minus extenso, quare thorax tunc magis flavescent, maculis 2 anticis fasciaque indistincta posteriore nigro-fuscis; scutelli maculis 2 basalibus vittaque posteriore flavescentibus.

Caput obtuse rotundatum, vertice oculo singulo vix duplo latiore, ubique æquilongus. Thorax vertice duplo longior; longitudine plus duplo et dimidio latior. Tegmina abdomen nonnihil superantia, venis subtilibus, areolis apicalibus elongatis."

A rendering of the foregoing is as follows:

Blackish, or black-fuscous; the basal margin of the vertex, a band

on the clypeus, the loræ (a spot excepted) the outer parts of the cheeks, a median longitudinal line, two small spots in front, and a somewhat curved fine line on both sides of the front side of the thorax, a band on the clavus at the suture, a fine longitudinal line on the corium near the base, the veins as far as the suture of the clavus, and the front, pale yellowish; the front with three basal spots, a longitudinal median line and a band on either side (composed of fine transverse lines) converging above the middle with an opposite spot and with the above mentioned middle basal spot, black-fuscous; the costal margin of the corium beyond the middle without color, hyaline. ♂, ♀. Length, 4.66, width, 1.5 mm.

Habitat: California, Puna, Taiti.

It varies sometimes in having the black color of the head and the thorax reduced, in which case the thorax is then yellower, the two anterior spots and the indistinct posterior band of the scutellum black-fuscous; the two basal spots of the scutellum, and the posterior band yellowish.

Head obtusely rounded; vertex scarcely twice the width of a single eye, throughout of equal length. The thorax twice as long as the vertex, more than two and one-half times wider than it is long. The elytra slightly surpassing the abdomen, the veins fine, the apical areoles elongated.

*Thamnotettix luctuosus* Stål has not been recognized by me in any of the material submitted to me for examination, but the foregoing original description and the figure of the type by Madame Ekblom will, no doubt, easily enable students to recognize the species.

## 28. *Thamnotettix fuscipennis* sp. nov.

Small, slender, head wider than pronotum; vertex nearly as long at middle as next the eye, sub-angulate, rounded to front; ocelli close to the eyes; front broad, convex, narrowing rather abruptly to the clypeus; clypeus broad, sides nearly parallel; loræ small, not reaching margin of cheek; cheeks narrow, outer margin sinuate. Pronotum a little longer than vertex, hind margin scarcely concave; scutellum as long as vertex; elytra with venation distinct. *Genitalia: female*, last ventral segment truncate, or slightly emarginate.

Vertex yellow, with fulvous angular spots; four black dots on the anterior margin. Pronotum olive-green with two fulvous stripes on the disk, and traces of a fulvous stripe on each side; scutellum yellowish, marked with fulvous; elytra dark brown or fuscous; the veins and patches in the areoles black fuscous; the inner border of the clavus margined with yellowish; a rather broad blackish spot on the veinlets at each end of the outer anteapical cell; beneath, face blackish; front dark fuscous with yellowish arcs and central line; clypeus, loræ, and cheeks, except the margin, blackish; thorax and abdomen



blackish; legs light yellow, except tip of tibiae and tarsal joints, which are faintly smoky.

Length: 3.75 mm.

Described from two female specimens, *type* and *paratype*, from Province del Sara, Bolivia, C. M. Acc. No. 5064, Feb. 1913 (Steinbach *coll.*). This species is most easily recognized by the light vertex and pronotum, the fulvous stripes, the dark elytra, and the blackish face.

29. ***Thamnotettix clypeatus* sp. nov.**

Robust; head scarcely wider than pronotum; vertex subangulate, one-third longer at middle than next the eye, obtusely angulate to front; front broad, narrowing from antennal pits to clypeus, merging into clypeus with indistinct sutures; clypeus long, slightly widened toward tip; loræ broad, distant from cheek border; border of cheek broadly sinuate. Pronotum nearly as long as vertex, strongly arched in front, truncate behind; elytral veins distinct; clavus with extra cross-veins, middle anteapical divided by a distinct cross-vein; a few cross-veinlets in inner anteapical and outer part of costal areoles. *Genitalia: male*, valve short, rounded behind; plates narrow, tapering to sharp upturned tips, margins with strong cilia.

Dull gray; vertex with four dots on anterior border, two slightly curved transverse bars on the disk. Pronotum with five whitish lines; elytral veins whitish, faintly margined with fuscous; front with light fuscous arcs; clypeus mostly fuscous; a dark dot on border of loræ; thorax, abdomen, and legs gray; femora and tibiae banded with fuscous; tarsal claws blackish.

Length: 5 mm.

One specimen, *type*, Province del Sara, Bolivia, C. M. Acc. No. 5064 (Steinbach *coll.*).

30. ***Thamnotettix colonus* (Uhler).**

*Deltocephalus colonus* Uhler, Proc. Zool. Soc. London, 1895, p. 80.

*Athysanus villicus* Crumb, Ann. Ent. Soc. Am., Vol. VIII, 1915, p. 194.

*Thamnotettix colonus* Van Duzee, Cat. Hem., 1917, p. 684.

Head slightly wider than pronotum, subangulate; vertex about as long as width between the eyes, more than half longer at middle than next the eye; front narrowing to clypeus, with which it is apparently fused, and continued with nearly straight margins to tip; clypeus narrow, slightly widening toward tip; cheeks sinuate. Pronotum about as long as vertex, strongly arched in front; margin nearly straight behind; elytra without second cross-vein. *Genitalia: female*, last ventral segment half longer than preceding, truncate; *male*, valve triangular; plates broad at base, tapering to narrow tips.

Light yellow; vertex with two large round black spots; face yellow, front and clypeus having brown borders, a blackish spot beneath antennæ, and two black dots bordering the eye. Pronotum yellow, with a brownish band near the hind border; scutellum yellow, with brownish triangles on the basal angles; elytra with brownish and yellow stripes, and a yellow costa; corium and apex transparent, or slightly smoky.

Length: 3.25 mm.

Five specimens from Bahia, Brazil, Jan. 7, 1908, C. M. Acc. Nos. 3765 and 4135 (Haseman *coll.*). One specimen from Lagoa Feia, Brazil, collected at night, June 29, 1908, by Haseman.

This species was originally described from the Island of St. Vincent, West Indies, and is a very common species in the southern United States. Evidently the above records carry it well into South America. As no records are at hand for Mexico and Central America it may be assumed as probable that the connection between North and South America has been by the way of the West Indies. In the southern states it occurs in enormous numbers in grass-lands, especially on Bermuda- and St. Augustine-grass, and may be considered as an economic pest, where these grasses have value as forage.

### 31. *Thamnotettix comatus* (Ball).

*Deltocephalus comatus* Ball, Canadian Entomologist, Vol. XXXII, 1900, p. 343.

*Thamnotettix comatus* Van Duzee, Cat. Hem. 1917, p. 684.

Closely resembling *T. colonus* (Uhler). Head wider than pronotum, subangulate; vertex a little wider than length at middle; one-fourth longer at middle than next the eye; front narrowed, scarcely separated from clypeus; clypeus with sides nearly parallel. Pronotum strongly arched in front, hind border nearly straight; elytral veins as in *T. colonus*. *Genitalia: female*, last ventral segment nearly twice as long as preceding, truncate or slightly concave; *male*, valve large, subangulate behind; plates short, triangular, tips bluntly angular.

Greenish yellow; vertex pale yellow, two large round black spots nearer the eye than to the center; two minute dots at apex of center, and in strongly marked specimens a pair of dots near the eye and a short oblique line on the disk, black. Pronotum olive-green, paler in front, with a pair of brownish spots on the front border, and in strongly marked specimens black dots on the disk and an oblique dash at the side, black; scutellum pale yellow, with black triangles on base; elytra pale green, nervures lighter yellowish; face light yellow with brownish borders on front and clypeus, a black spot under antennæ and two black dots next the eye; thorax and abdomen mostly black. *Genitalia: female* pygofers yellowish, marked with

black; *male*, valve and plates pale, the latter with an oblique fuscous mark near the border.

Dr. Ball described this species as from Orizaba and "other Mexican points." The author's collection contains specimens of his own collection from Orizaba, Mexico, and from Santa Lucia, Los Amates, and Gualan, Guatemala, collected by J. S. Hine. There are specimens in the Carnegie Museum from Santarem, Brazil, Acc. No. 2966 (H. H. Smith *coll.*) and Acc. No. 4043, Dec., 1909 (Haseman *coll.*). These Brazilian specimens are not as strongly marked, and in some cases lack the discal dots of the pronotum, but in other respects they seem definitely to belong to this species. It is quite similar to *T. colonus* Uhler, differing in the black markings of the pronotum, lacking the brown band of the pronotum, and perhaps differing in the details of the genitalia. Inasmuch as these differences appear to be emphasized in specimens from the more northern localities, it seems probable that the two species originated from a common stock, probably indigenous in the Amazonian basin.

### 32. *Thamnotettix acuminatus* (Uhler).

*Deltocephalus acuminatus* Uhler, Proc. Zool. Soc. London, 1895, p. 80.

Elongate; head scarcely wider than pronotum, distinctly angulate in front; vertex scarcely wider than length at middle, nearly half longer at middle than next the eye, rounded to front; front broad, sides nearly parallel, abruptly narrowed at apex; clypeus long, slightly widened at tip; loræ broad; cheeks broad, distinctly sinuate. Pronotum half longer than vertex, strongly arched in front, sinuate behind the eye, truncate behind; scutellum rather small; elytra reaching to tip of pygofer, but not to tip of ovipositor. *Genitalia: female*, last ventral segment with lateral angles rounded, hind borders slightly produced, feebly sinuate; ovipositor long, exceeding the pygofer by one-third its length.

Light green above, mostly black below; vertex yellowish green, two large black spots on anterior border, united at base of front and continued as a median stripe including a yellow line, frontal arcs light yellow; clypeus light yellow with a median black spot; borders of loræ black; cheeks beneath the eye to the border, black. Pronotum yellowish green, a black band between the eyes; scutellum yellowish, bordered with black at base; elytra greenish with a more or less hyaline disk and apex. Beneath, black; legs dull yellowish; hind tibiæ with dots and apex fuscous; hind tarsi bordered with fuscous; claws blackish.

Length: female, 3.75 mm.



Collected at Boqueirão, Rio Grande, Brazil, Jan. 8, 1908, C. M. Acc. No. 3533 (Haseman *coll.*).

This species was described from the island of St. Vincent, and evidently has a considerable distribution in South America, although it does not appear to have been recorded for this region.

33. ***Thamnotettix chapadensis* sp. nov.**

Head slightly wider than pronotum, obtusely angulate; vertex broad, nearly twice as wide as length at middle, nearly one-half longer at middle than next the eye; front convex; clypeus with a broad ridge on the disk; loræ nearly touching margin of cheek; margin of cheek nearly straight. Pronotum nearly twice as long as vertex, truncate behind; scutellum with an acute point at tip. *Genitalia: male*, valve obtusely angled; plates elongate; tapering gradually from base to the compressed, bluntly rounded tip.

Dull yellow; vertex with a distinct marginal line starting just behind the ocelli, disk faintly infuscated. Pronotum yellowish with fine brown irrorations, darker toward the posterior border; scutellum light yellowish, with a dark median line and becoming darker to the longitudinal white lines of the base; elytra suffused with metallic brown, the veins broadly dark brown or fuscous, apex smoky, beneath uniformly yellow.

Length: 4 mm.

One specimen, male, *type*, from Chapada, Brazil, C. M. Acc. No. 2966 (H. H. Smith *coll.*).

34. ***Thamnotettix hyalinipennis* Stål.** (Plate LVIII, fig. 1).

*Jassus (Thamnotettix) hyalinipennis* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 52.

This species was described in Part 2 of this series of papers from females, identified by Stål's description. Since the publication of Part 2 we have received a careful drawing of the type, which is a male (See Pl. LVIII, fig. 1), and we have also had in hand a specimen of the male, which beautifully agrees with the type as figured, and also with the females, which have been described. The male valve is rather large, broadly rounded behind; the plates distinctly convex at the base; the outer margin faintly sinuate, the tips acute, and the margins minutely ciliate.

In the figure received from Madame Ekblom the cilia seem too long for normal, and have somewhat the appearance of bearing minute threads of mold. In every other respect the drawing fits

our specimens so closely as to make sure that we have correctly identified the male.

This male specimen is from Cachoeiro, Santos, Brazil, taken June, 1908, C. M. Acc. No. 3579 (Haseman *coll.*). This record adds another locality to those already given for the species.

35. *Thamnotettix magnificus* sp. nov.

Very large; head wider than pronotum, short, bluntly arched; vertex very broad, scarcely as long at middle as next the eye, disk minutely rugose, anterior margin rounded to front; front broad at base, narrowing rather uniformly to apex, somewhat flattened; clypeus widening toward the tip, apex truncate; loræ broad, outer margins strongly arched, approaching border of cheek; cheeks narrow, scarcely sinuate. Pronotum more than three times as long as vertex, strongly arched in front, lateral margins very short, faintly carinate, postero-lateral margin oblique, angles broadly rounded, hinder border sinuate; scutellum triangular; elytra long, narrow, considerably narrowed behind the middle, appendix large, outer anteapical cell shorter. *Genitalia: female*, last ventral segment twice as long as preceding, hind border a little produced and with a broad notch reaching about one-fourth the distance to the base.

Light creamy-yellow; two bands on the head, one just before and one just behind the line joining the ocelli, orange; a faint orange band on the front in line with the antennæ; a stripe between the ocelli and on base of vertex, pale vitreous. Pronotum fulvous, the basal and lateral border and a transverse band parallel to the anterior border, vitreous, becoming yellow laterally; scutellum fulvous on basal half and at tip, with a cross-band of pale yellow behind the middle; elytra fulvous, with yellowish hyaline areas, one at base, a broad one at apex of scutellum, an oval one at middle, and an elongate one bordering the claval suture to the tip, a basal, four discal, and one sub-apical elongate, somewhat quadrangular, nearly in line from base to end of costa; a black broken stripe from base paralleling claval suture to the end of the middle anteapical cell, a black spot covering the second apical cell; apical border of membrane smoky, interrupted with dull hyaline; wings black. Beneath uniformly light cream-yellow, tarsal claws fuscous; tergum and upper pygofer black; ovipositor light brown, darker at tip.

Length: 12 mm.

One female specimen, *type*, Quatro Ojos, Bolivia, C. M. Acc. No. 5065, Nov., 1913 (Steinbach *coll.*).

This is the largest species which I have so far seen in this genus, and it bears a striking resemblance to some of the ornate species of *Cicadella*.

36. *Thamnotettix luteus* sp. nov.

Head slightly wider than pronotum, rather strongly arched and faintly subangulate; vertex broad, three times as wide as length, scarcely wider at middle than next the eye, rounded to front; front broad, slightly convex, narrowing sharply from antennæ to clypeus; clypeus scarcely widened toward the tip; loræ large, almost reaching border of cheek; cheeks broad, sinuate. Pronotum twice as long as vertex, nearly truncate behind; elytra long, veins distinct, except those surrounding outer anteapical. *Genitalia: male*, valve one-half longer than last ventral segment, apex blunt; plate exceeding valve by more than twice its length, broad at base, gradually rounded to blunt, slightly rounded apices.

Pale straw-color; vertex with a light brown band, paralleling the margins; eyes brownish. Pronotum faintly marked along anterior border; scutellum with four whitish areas on the basal margin; elytra pale luteous, sub-hyaline; the veins of clavus and inner part of corium and tip, whitish; sub-costal indistinct. Beneath uniformly pale straw-color, tip of rostrum black.

Length: 5 mm.

One specimen, *type*, from St. Isabel, Uruguay, Nov. 12, 1909, C. M. Acc. No. 3793 (Haseman *coll.*).

37. *Thamnotettix venatus* sp. nov.

A slender species, head slightly broader than pronotum, angulate; vertex one-half longer in middle than next the eye, as long in middle as width between the eyes; front rather long; sides sinuate; apex rather narrow; clypeus elongate, nearly twice as long as width at base; loræ small, distant from border of cheek; margin of cheek slightly sinuate. Pronotum as long as vertex, twice as wide as long; hind border faintly concave; scutellum scarcely as long as pronotum; elytral venation conspicuous; the central anteapical cell closed at center by fusion of veins. *Genitalia: female*, last ventral segment slightly produced and thickened at the middle, lateral angles rounded.

Ivory-fulvous; vertex ivory-white, with two fulvous and four dark points on the anterior border, two close to the apex, and ocher stripes half-way to the eye on each side. Pronotum fulvous, with a central and lateral stripe in the hind border, ivory-white; scutellum mostly fulvous; elytra with the veins broadly ivory-white; the areoles fulvous, with fuscous borders; a darker fuscous spot at center of clavus, and another behind the middle of costa and the apical portion of the inner anteapical, the first and second apical areoles infuscated; front olive-gray with whitish arcs; elytra dusky; cheeks whitish with margins of loræ fuscous; legs whitish; anterior femora



annulate with fuscous; tarsal claws blackish; abdomen beneath whitish; apex of last ventral segment smoky.

Length: 3.50 to 3.75 mm.

Described from five specimens from Province del Sara, Bolivia: three taken in Nov., 1909, C. M. Acc. No. 4549, 450 M.; one in Dec., 1913, C. M. Acc. No. 5064; the fifth in Dec., 1918, C. M. Acc. No. 6443, 450 M. (Steinbach coll.).

*Type* and *paratypes* in Carnegie Museum. *Paratype* in Osborn Collection.

This species has much the appearance of the light form of *Deltocephalus inimicus*, but, aside from the difference in venation, the details of the color-pattern are distinct. It is similar to *Deltocephalus lepidellus* Stål, (See Plate LVII, fig. 1), differing from that species in the narrower body.

In venation these species resemble the group of *Thamnotettix shermani*, *T. crumbi*, etc.

#### Genus TERULIA Stål.

*Terulia* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 50.

#### 38. *Terulia ferruginea* Stål.

*Terulia ferruginea* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II' K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 50.—Spångberg, Homoptera Americana, 1879, Pt. 6, p. 20.

Large ovate; head much narrower than pronotum, obtuse in front; vertex the width of the eyes, wider than long, scarcely longer at middle than next the eye; ocelli about twice as far from each other as from the eyes; front rather narrow, distinctly carinate; clypeus long, expanded at tip, carinate; loræ elongate; cheeks narrow, deeply sinuate under the eyes. Pronotum short, more than half longer than vertex, strongly carinate at sides, distinctly granulate; scutellum acuminate, rather minutely granulate on the disk; elytral veins raised. *Genitalia: female*, last ventral segment nearly three times longer than preceding; middle part produced, rounded; a distinct carina, diminishing to base.

Uniformly rusty brown, scarcely paler below.

Length: female, 12 mm.

A single specimen in the collection of the author from Bartica, British Guiana, Aug. 16, 1901, collected by H. S. Parish. This

specimen differs from Spångberg's description in lacking the yellow margins of the vertex and the middle line of front, and also in the greater length of the last ventral segment, but agrees so closely in all other respects that it can hardly be separated as a distinct species. Considering the frequent differences of coloration of the sexes and a very close agreement indicated by the figures it seems very probable that *T. nigriceps* Stål is the male of *ferruginea* Stål, in which case it would become a synonym, as *T. ferruginea* appears first on the page of Stål's paper.

Genus JASSUS Fabricius.

*Jassus* Fabricius, *Systema Rhyngotorum*, 1803, p. 85.

39. **Jassus venosus** (Germar).

*Cælidia venosa* Germar, Mag. d. Ent., Vol. IV, 1821, p. 76.

*Cælidia venosa* Burmeister, Handb. d. Ent., Vol. II, Pt. I, 1835, p. 114.

*Cælidia venosa* Walker, Homoptera, Pt. III, 1852, p. 852.

Head narrow; vertex about as long as wide, somewhat produced before the eyes, sub-angulate in front; front narrow, widening slightly below the eyes, distinctly carinate; clypeus long, more than twice as long as wide, with a central carina, tip expanded; loræ narrow; cheeks with outer border distinctly sinuate. Pronotum longer than vertex, widened behind; hind border slightly concave; scutellum acuminate, nearly as long as vertex and pronotum together; elytral veins conspicuous, elevated. *Genitalia: female*, last ventral segment elongate, much produced on the middle, and distinctly carinate; *male*, plates elongate, compressed, upturned at tips.

Dark brown; vertex and pronotum with fulvous lines, the latter with numerous minute dots; scutellum lineate, dotted on the disk; elytral veins with numerous yellowish or ivory dots, an irregular band of spots across the middle of clavus and a triangular spot toward the tip, opposite the transverse vein; beneath light brown, tips of tibiæ and tarsal claws darker.

Length: female, 10 mm.

Two females from Santarem, Brazil, July, 1919, C. M. Acc. No. 6324 (S. M. Klages *coll.*); one female, Minca, Colombia, June, C. M. Acc. No. 1999 (H. H. Smith *coll.*).

I have also a specimen in my own collection from Bartica, British Guiana, May 25, 1901, collected by H. S. Parish. This species is evidently common over a large area of northern South America, ranging from the Carribean to central Brazil.

40. *Jassus cingulatus* (Stål).

*Cælidia cingulata* Stål, Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 50.

Head broad, but not as wide as pronotum. Vertex quadrate, wider than long, slightly convex in front; front narrow, widening below the eyes, distinctly and rather sharply carinate; elytra long, twice as long as width at base, enlarged, and with the borders somewhat reflexed at tip; loræ narrow, angulate above and below; cheeks narrow, slightly sinuate. Pronotum longer than vertex, granulate; scutellum acuminate, faintly granulate on the disk; elytra with veins prominent and bearing numerous elevated yellowish dots. *Genitalia: female*, last ventral segment twice as long as preceding, middle portion somewhat produced, faintly carinate; *male*, valve represented by the membranous lobes extending upon the plates; plates elongate, flattened, appressed to the pygofer; tips acute, curved upward; the surface slightly ridged; pygofers broad, narrowing posteriorly to tip of plates.

Testaceous; vertex with a fulvous band back of the ocelli; ocelli black; front with fuscous spots and short arcs; elytra, loræ, and lower part of the cheeks with fuscous spots. Pronotum dark fuscous, with numerous fulvous or yellowish granular dots; scutellum black with sparsely dotted fulvous granules on the disk; tip brownish yellow; elytra dark brown to fuscous, with a sub-hyaline spot in the basal areas, a distinctly sub-hyaline band broken by the veins, crossing the elytra behind the scutellum, and another band somewhat less regular across the apex of clavus; apical cells dark brownish or fuscous with some lighter vitreous patches; thorax and abdomen beneath yellowish, with fuscous patches on pleural pieces and coxæ; the legs lineate with fuscous; tips of tibiæ and tarsal claws blackish.

Length: female, 9 to 10 mm.

Three female specimens are referred to this species: one from Chapada, Brazil, C. M. Acc. No. 2966, Sept. 1, (H. H. Smith *coll.*); one from Province del Sara, Bolivia, C. M. Acc. No. 5064 (Steinbach *coll.*); one from Pied Saut, Oyopok River, French Guiana, C. M. Acc. No. 6111 Nov., 1917 (S. M. Klages *coll.*).

Three male specimens from Province del Sara, Bolivia, bearing the same date and locality as the females mentioned above, are also referred here, and one male specimen from Santa Cruz de la Sierra, Bolivia, 450 M., Nov., 1910, C. M. Acc. No. 4549 (J. Steinbach *coll.*).

The four males, which must quite certainly be referred to this species, show variation in the coloration of the vertex in front, but agree in so many other details that there seems little question of their identity.



41. *Jassus limpidosparsus* (Stål).

*Cælidia limpidosparsa* Stål, *Eugenies resa*, Ins. Hemipt., 1858, p. 290; Bidrag till Rio Janeiro-Traktens Hemipter-fauna, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, No. 6, 1860, p. 51.

Head rounded in front; vertex nearly quadrate, scarcely as wide as long, with a median carina; front narrow, with a median carina; clypeus long, twice as long as width at base, apex expanded. Pronotum slightly longer than vertex, distinctly granulate; elytral veins raised, and with rather sparse swollen dots. *Genitalia: female*, last ventral segment twice as long as preceding; produced and rather deeply notched at middle.

Light brown; vertex immaculate. Pronotum mottled with fuscous; scutellum with two light spots near the base, behind which are two dark brown or fuscous spots. Elytra black or smoky, the elevations of the veins light yellow; irregular transverse broken bands, one crossing middle of clavus, the other just behind tip of clavus; the large spot on costa a little darker than the other spots. Beneath, face dull yellowish-brown; borders of front with reddish stripe; apex of clypeus black; legs light brown. Abdomen black; pygofer brown.

One specimen from Bartica, British Guiana, May 6, 1901, in collection of author (H. S. Parish coll.).

42. *Jassus adspersus* (Stål).

*Cælidia nigrina* Stål, *Æfvers. Vet. Ak. Förh.*, Vol. XI, 1854, p. 254, ♂.

*Cælidia adspersa* Stål, *Æfvers. Vet. Ak. Förh.*, Vol. XI, 1854, p. 254, ♀;—*Eugenies resa*, Ins. Hemipt., 1858, p. 290. ♂, ♀.

*Jassus adspersus* Spångberg, *Æfvers. K. Vet. Ak. Förh.*, Vol. XXXV, No. 8, 1878, p. 21.

Head narrow and subangulate in front; vertex narrow at base, widened to tip, carinate; front narrow with numerous arcs, and central carina. Pronotum as long as vertex, granulate; elytral veins with numerous swollen dots. *Genitalia: female*, last ventral segment produced at middle; lateral angles prominent, not as long as the middle; *male*, plates rather broad, flat, slightly upturned, acute at tip.

Black; female lighter than male; vertex light grayish, with light fuscous spots. Pronotum black, with yellowish granules, scutellum black, with yellow dots; margin yellowish; elytral veins with numerous yellow raised dots; the costa pale. Beneath blackish; front with numerous transverse fuscous arcs. Legs brown, striped with black. In the female the legs entirely black, as also the lower part of the front and the costal border.

Length: female, 6 mm.; male, 5 mm.

Two specimens, male and female, Cruz Alta, Rio Grande do Sul, Brazil, in the author's collection. Originally described from Montevideo, Uruguay.

43. *Jassus nervosus* (Fabricius).

*Jassus nervosus* Fabricius, Systema Rhynngotorum, 1803, p. 85.

*Cælidia pæcila* Germar, Mag. d. Ent., Vol. IV, 1821, p. 77.—Walker, Homoptera, Pt. III, 1851, p. 852.

*Jassus nervosus* Stål, Hemiptera Fabriciana, 1869, p. 79.

Head narrow; vertex slightly longer than wide; margin slightly raised, scarcely produced before the eyes; front narrow, widening to beneath the eyes, contracted sharply to clypeus, with a prominent sharp central carina; clypeus twice as long as width at base, expanded at apex, distinctly carinate; loræ elongate, somewhat elevated near the anterior border; cheeks with outer border slightly sinuate. Pronotum short, a little longer than vertex; lateral angles prominent; scutellum acuminate; elytral vein; somewhat elevated; inner vein of clavus obscure. *Genitalia: female*, last ventral segment long, twice as long as preceding; the middle part slightly produced, with central carina and a slight apical notch.

Brown; vertex anteriorly brown; posterior half yellowish; front brown; border between vertex and front with two dark spots enclosing ocelli; apex of front and base of clypeus whitish, forming part of the transverse band underneath the eye, extending to the propleuræ; apex of clavus, tips of loræ, and lower part of cheek, brownish, or dark fuscous. Pronotum and base of scutellum, brown; apex of scutellum yellowish; elytra brown, with sub-hyaline yellowish white patches on the costa, apical part of corium; and dark fuscous patches on the clavus at base of corium, and occupying the larger part of the apical part of corium; beneath, coxæ and bases of femora, blackish; the rest of legs dull yellowish with tips of tibiæ and tarsal joints and claws smoky.

A specimen referred to this species is from the Mana River, French Guiana, May, 1917, C. M. Acc. No. 6008 (Klages coll.).

44. *Jassus ruficosta* Jacobi.

*Jassus ruficosta* Jacobi, Sitzungsber. Ges. Naturf. Freunde, Berl., 1905, p. 187.

Head broad, moderately arched; vertex about as long as width between the eyes, widening forward; front widening to below the eyes, narrowed abruptly to clypeus, with a low sharp median carina; clypeus longer than wide, widening at tip. Pronotum slightly longer than vertex, minutely granulate; scutellum small, acuminate, minutely striate on the disk. *Genitalia: female*, last ventral segment long, lateral angles rounded, posterior margin with four sharp teeth, the inner ones separated by a deep notch; ovipositor long, extending beyond the tip of pygofer, and about one-fourth its length beyond the tip of elytra; *male*, valve hidden; plates elongate, bluntly rounded at tips.

Female uniformly black, with a pale band across the apex of vertex and base of front; vertex mostly yellowish, with black dots; minute yellowish dots on the elytral veins. Male with dull brown or reddish on costa, extending over the outer anteapical cell; beneath blackish, with narrow yellow margins on pleural pieces; middle and fore tibiæ pale, and hind tibiæ somewhat brownish; pleural pieces and abdominal segments narrowly margined.

Three specimens in the collection of the author, two females and one male, taken at Marcapata, Peru, the type-locality.

#### 45. *Jassus bellus* Jacobi.

*Jassus bellus* Jacobi, Sitzungsber. Naturf. Freunde, Berl., 1905, p. 185.

Head broad, distinctly arched; vertex widening from base to front, longer than width at base of eyes; front widening to below the eyes, rounding to clypeus, without central carina; clypeus short, inflated; loræ very narrow, reaching tip of clypeus; cheeks with outer margins nearly straight. Pronotum slightly longer than vertex, strongly arched between the eyes; scutellum acuminate; margins at apex elevated; elytral nervures raised. *Genitalia: male*, plates narrow; margins raised; apex blunt.

Black, conspicuously marked with orange-yellow; vertex bordered with yellow; two stripes from inner angles of eye across pronotum and scutellum and a large lateral patch, apex of scutellum, outer part of clavus, especially at base, large patch occupying costal and discoidal areoles on the middle third, and a row of oblique dots and spots from tip of clavus to apex, orange; beneath black, tips of fore and middle femora, margins of pleural pieces, and narrow margin of abdominal segment orange-yellow.

Three specimens in the collection of the author, two from Calanga, Peru, a type-locality, and one from Yungas, Bolivia.

#### 46. *Jassus montanus* Jacobi.

*Jassus montanus* Jacobi, Sitzungsber. Naturf. Freunde, Berl., 1905, p. 187.

Head broad and short; vertex slightly wider than long, rounded anteriorly; margins slightly elevated; front scarcely narrowing below, truncate at apex, sharply carinate; clypeus twice as long as width at base, widened at apex with a central elevated ridge; loræ narrow, acutely angular below; cheek margins sinuate. Pronotum short, scarcely longer than vertex, hind border sinuate; pronotum, scutellum, and elytral veins granulate. *Genitalia: female*, last ventral segment two and one-half times as long as preceding; hind border slightly produced, with a broad notch at the middle and a central carina.

Black, or dark fuscous; vertex and eyes pale; front blackish with short transverse light arcs; clypeus, loræ, and cheeks dirty white, with



some faint fuscous patches. Pronotum and scutellum black, with whitish granules; elytra black, smoky, with the veins bearing elevated ivory-white dots; a broken transverse band just behind scutellum, and another just at the tip of the clavus, expanded on the costa; beneath black; legs pale brownish, with femoral lines, tips of tibiæ, and tarsal claws, blackish.

Length: female, 7.25 mm.

One specimen from Quatro Ojos, Bolivia, Nov., 1913, C. M. Acc. No. 5065; one specimen from Province del Sara, Bolivia, April, 1913, C. M. Acc. No. 5064 (Steinbach coll.).

My collection includes three specimens from Callanga, Peru, the type-locality of the species. The species appears to vary considerably in the intensity of coloration, especially on the front, and in the extent of the transverse bands of the elytra.

#### 47. *Jassus dissolutus* Jacobi.

*Jassus dissolutus* Jacobi, Sitzungsber. Naturf. Freunde, Berl., 1905, p. 186.

Head broad, obtusely rounded; vertex wider than long, widening slightly toward the apex; ocelli in slight depressions close to anterior border; front rather narrow, about equally broad at apex and at base of apex, with a distinct median carina; clypeus somewhat tumid, obtusely carinate; apex scarcely expanded; loræ narrow, sharply angular; cheeks narrow, outer margin nearly straight. Pronotum longer than vertex, distinctly granulate; scutellum acuminate, slightly granulate on the disk. *Genitalia: male*, plates narrow, strongly up-curved at middle, widening toward the tips, then narrowing to widely separated acute tips.

Black with numerous yellow or whitish dots; vertex yellowish with an oblique spot between the eyes and a discal dot below the base. Pronotum and scutellum black, closely dotted with yellow; tip of scutellum yellow; elytral veins with conspicuous yellow dots; a series of sub-hyaline spots near base, another forming a transverse band beyond apex of scutellum, and a third more broken band at apex of clavus; these appear as transverse bands and spots interrupted by the veins; face black with front marked with short arcs and irregular spots; disk of clypeus yellowish; borders of loræ and cheeks pale; pleural pieces and margins of abdominal segments black, with yellow margins; legs fuscous, or blackish; tibiæ paler.

Length: 8 to 10 mm.

Three specimens in the collection of the author, one from Marcapata, Peru, and two from Yungas, Bolivia, type-localities.

48. *Jassus lugubris* Spångberg.

*Jassus lugubris* Spångberg, Species Jassi generis Homopt., Æfvers. Ak. Förh., Vol. XXXV, 1878, p. 16.

Black or dark fuscous; head obtuse; vertex about as long as wide; sides divergent; ocelli in sunken areas between carinæ; front elliptic, distinctly carinate; clypeus twice as long as wide, carinate, expanded toward tip. Pronotum a little longer than vertex, granulate; elytra broad, rather short. *Genitalia: female*, last ventral segment twice as long as preceding; hind border faintly sinuate, shallowly notched at center.

Face, pronotum, scutellum, and most of elytra, black, or dull fuscous; vertex and base of front yellowish white, with fuscous patches on the middle of front and reddish suffusion at base of front; ocelli black; elytra with dull brown markings, forming an indistinct band behind middle of clavus, and the apical areoles mostly dull brown with the margins smoky; wings smoky; veins black. Beneath blackish; abdominal segments margined with yellowish; legs mostly dark fuscous; tips of femora and base of tarsal joints lighter.

Length: 7 mm.

One specimen from the Mana River, French Guiana, June, 1917, C. M. Acc. No. 6009 (Klages *coll.*) agrees very closely with Spångberg's description of the female from "Cayenne."

49. *Jassus atratus* Fabricius.

*Jassus atratus* Fabricius, Systema Rhyngotorum, 1803, p. 86.

*Jassus atratus* Stål, Hemiptera Fabriciana, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. III, 1869, p. 80.

Head obtuse; vertex as long as width between the eyes, slightly divergent anteriorly, scarcely depressed at ocelli; front elliptic, faintly carinate; clypeus sub-carinate, widened at tip, truncate, or slightly concave. Pronotum as long as vertex, granulate. *Genitalia: male*, plates narrow, elongate, somewhat twisted and compressed toward the acuminate tips.

Vertex and face pale olivaceous; borders of front reddish. Pronotum, except anterior border, scutellum, and a broad area of elytra widening to cover the apical part, black, or fuscous; clavus, costa, and most of anteapical cell, brownish-hyaline; veins black; wings smoky, with black veins; thorax and abdomen black, with pale brownish borders; fore and middle legs pale brown; hind legs blackish; apex of femora and of tibiæ and the tarsal joints, pale brown.

Length: male, 8 mm.

One male specimen from Las Juntas, Bolivia, Dec., 1913, C. M. Acc. No. 5066 (Steinbach *coll.*), answers very closely to Stål's description and more nearly represents this species than any specimens

I have seen. It is, however, near enough to *J. pruinus* or *J. auratus* to be the male of one of these species.

#### 50. *Jassus pruinus* (Germar.)

*Cælidia pruinosa* Germar, Mag. d. Ent., Vol. IV, 1821, p. 78.—Walker, Homoptera, Pt. III, 1851, p. 853.

*Jassus pruinus* Spångberg, Öfvers. Vet. Ak. Förh., Vol. XXXV, 1878, p. 14.

Head broad and short, not as wide as pronotum; vertex broader than long, slightly rounded in front, borders scarcely raised; front long, ovate, faintly carinate; clypeus long, sides nearly parallel; apex slightly expanded; loræ elongate, narrowed below; cheeks sinuate. Pronotum broad, short, about one-fourth longer than vertex, minutely granulate; elytral veins raised, not pustulate. *Genitalia: female*, last ventral segment very long, two and one-half times as long as preceding, with a broad triangular tooth behind, and a rather prominent central carina.

Brown; some specimens distinctly pruinose; vertex and eyes above, greenish olive; vertex with two dark dots on the disk behind ocelli; face light olive-green; lateral borders of front and the central part of clypeus reddish. Pronotum brown; scutellum brown with a discal fuscous spot, wanting in some specimens; elytra brown with a central discoidal areole, an oblique patch on anteapical and apical areoles, fuscous; beneath greenish; the legs tinged with fuscous; tips of tibiæ and the tarsal claws blackish.

Length: female, 8.5 to 10 mm.; male, 8 to 9 mm.

One specimen, Hyatanahan, Rio Purús, Brazil, Mar., 1922, C. M. Acc. No. 6963 (S. M. Klages coll.); one specimen, Las Juntas, Bolivia, Dec., 1913, C. M. Acc. No. 5066 (Steinbach coll.).

#### 51. *Jassus auratus* (Fabricius).

*Cercopis aurata* Fabricius, Mantissa Insectorum, Vol. II, 1787, p. 274.

*Cercopis aurata* Fabricius, Entomologia Systematica, Vol. IV, 1794, p. 52.

*Cercopis aurata* Fabricius, Systema Rhyngotorum, 1803, p. 95.

*Jassus auratus* Stål, Hemiptera Fabriciana, Pt. II, K. Svensk. Vet. Akad. Handl., Vol. VIII, 1864, p. 80.

Pale yellowish olive, tinged with brownish; head obtuse; vertex scarcely as long as width between eyes; ocelli prominent, scarcely farther from each other than from border of eye; front narrow with a distinct, but low, carina; clypeus twice as long as width at base, expanded at tip; apex concave. Pronotum a little longer than vertex, minutely granulate; scutellum granulate on base; elytral veins distinct. *Genitalia: female*, last ventral segment twice as long as preceding, produced on the middle, deeply sinuate at the sides, strongly carinate, notched at tip.



Olivaceous; ocelli red; margins of front red. Pronotum, scutellum, and elytra light brown; veins darker; apex sub-hyaline; wings smoky; veins distinctly blackish; proboscis, spines of hind tibiæ, and the tarsal claws, infuscate.

Length: 8 mm.

One female specimen from Quatro Ojos, Bolivia, Nov., 1913, C. M. Acc. No. 5065 (Steinbach coll.). This agrees closely with Stål's description of the Fabrician species, except that it is not quite as long. Stål says: "*J. pruinoso maxime affinis, dilutior, excepta differentia parva picturæ vix divergit nisi segmento ultimo ventrali apud feminam apice utrimque latius et minus profunde sinuato*," and it appears quite possible, from the few specimens I have seen, that these species may be the same. In this case *J. auratus* has priority. Spångberg lists *J. pruinusus* from both Brazil and Cayenne, so that there is no basis of distribution, upon which to separate the two species, unless Spångberg's reference of the Cayenne specimens should have been to *J. auratus*.

#### 52. *Jassus ensiger* sp. nov.

A large species with male plate slender, elongate, and slightly curved or sword-shaped at tip; head obtuse; vertex slightly produced before the eyes; wider than long, scarcely longer at middle than next the eye, with a faint carina at base; ocelli nearly twice as far from each other as from border of the eye; front with a small, but distinct, carina; clypeus tumid at base, subcarinate toward tip, expanded toward apex, deeply concave at apex. Pronotum a little longer than vertex, distinctly granulate; scutellum minutely, but sparsely, granulate at base. *Genitalia: male*, plates long, slender, widest about the middle with a strong carina near the margin, the apical part narrowed, gently curved, sword-shaped, and acute at tip.

Greenish yellow or pale olive, tinged with brown; ocelli brown; borders of front tinged with fulvous, or orange. Pronotum, scutellum, and elytra suffused with brown; the corium with a fuscous cloud on the disk, and the principal veins black; wings smoky, veins black; thorax and abdomen greenish yellow, with broad fuscous areas on the abdominal segments; male plates tinged with brown; legs pale brown; hind femora and tibiæ tinged with fuscous.

Length: 9 mm.

Described from one male specimen, type, Hyatanahan, Rio Purús, Brazil, Mar., 1922, C. M. Acc. No. 6963 (S. M. Klages coll.). This species belongs with the *pruinusus-auratus* group, but is different from any form which I have met. Except in size, the species might be considered as the male of *J. auratus*.

53. *Jassus maculipennis* Spångberg.

*Jassus maculipennis* Spångberg, Öfvers. K. Vet. Ak. Förh., Vol. XXXV, 1878, p. 29.

Head broad, short; vertex about as long as width at base with faint carina; lateral margins slightly elevated; front margin between ocelli subangulate; front widening to below the eye, then narrowing to base of clypeus, faintly carinate; clypeus broad, elevated to beyond the middle; apex expanded; cheeks distinctly sinuate. Pronotum short, scarcely longer than vertex, minutely granulate; scutellum large, acuminate, very minutely granulate on disk, and striate on apex; claval veins parallel. *Genitalia: male*, valve hidden; plates elongate, tapering toward tip, curved upward; tips acute.

Vertex and face greenish yellow, with broad ferruginous stripes bordering the front and united on base and central apex of clypeus. Pronotum black, anterior border brown; scutellum black, narrowly margined with brown; elytra smoky black; the clavus from tip of scutellum to apex, and the costa and costal border, brown. Beneath black, fore and middle legs, and apical part of hind femora, pale.

Length: 8 mm.

This species was described from Bogotá, and I have four specimens in my collection from Marcapata, Peru. These are somewhat larger than Spångberg indicates, and differ slightly in the color-pattern.

54. *Jassus ferruginosus* sp. nov.

Head broad, short; vertex wider than long, rounded anteriorly; ocelli distinctly on the border between vertex and front; front narrow, widening to below the eyes, with a faint median carina; clypeus twice as long as width at base; apex expanded; cheeks narrow, sinuate. Pronotum scarcely as long as vertex, distinctly granulate; scutellum broad, disk depressed, lateral borders elevated, basal part minutely granulate. *Genitalia: female*, last ventral segment long, about four times as long as preceding segment, lateral angles rounded; posterior border sinuate, with a shallow notch at middle and a median carina.

Uniformly rusty brown; vertex and face paler, light brown; legs light brown; pectus and base of abdomen black; last ventral and preceding segment light brown; pygofer and ovipositor reddish brown, the latter tipped with black; scutellum with a narrow black line at base, close to the lateral margin; elytra sub-hyaline; veins a little darker; a smoky patch in the outer apical cell.

Length: 8 mm.

Described from one female specimen, *type*, from Chapada, Brazil, August, C. M. Acc. No. 2966 (H. H. Smith *coll.*).

This species appears to come near to *J. meditabunda* Spg., but,

aside from the much longer female ventral segment, it differs from the description in lacking the black markings on scutellum and elytra.

55. *Jassus brunneus* sp. nov.

Head scarcely wider than pronotum, rather strongly arched; vertex broad, obtusely angularly produced before the eyes; ocelli distinctly behind its anterior border; lateral margins nearly parallel; width a little longer than length at middle, about one-fourth longer at middle than next the eye; front broad at base, elevated below antennæ, narrowed to clypeus, with a distinct carina and transverse rugæ; clypeus broad at base, narrowing to near tip, then abruptly widened, obscurely carinate; loræ small; cheeks deeply sinuate below the eye. Pronotum about one-fourth longer than vertex, distinctly granulate; scutellum deeply depressed on disk; lateral margins elevated; disk minutely granulate. *Genitalia: female*, last ventral segment one-half longer than the preceding, hind border nearly truncate, faintly notched at middle.

Dark-brown, a little paler below; the costal margin and a small irregular band beginning in first outer apical cell and extending to tip of clavus, and the tips of the two middle apical veins, smoky; pleural pieces and margins of abdominal segments black, or fuscous.

Length: 8 mm.

Described from two female specimens, one, the *type*, from the Mana River, French Guiana, May, 1917, C. M. Acc. No. 6008 (S. M. Klages *coll.*); and another in the collection of the author, *para-type*, from Bartica, British Guiana, May 24, 1901 (H. S. Parish *coll.*).

The latter specimen differs from the type in lacking the black stripe of the front and the black color of the clypeus, and is less conspicuously marked with black on the thorax. The shape of the vertex is distinctly different from related forms of *Jassus* in the distinctly angular border and position of the ocelli, which might almost be considered as placing it in the Genus *Gypona*. However, in all essential structures it is distinctly a *Jassus*.

56. *Jassus fascifrons* sp. nov.

Pronotum distinctly wider than the head; head somewhat arched; vertex longer than wide, with a median carina and lateral elevated margins; ocelli close to the front margin; front long, rather narrow, distinctly carinate; clypeus long, slightly expanded at apex, distinctly carinate; loræ and cheeks narrow. Pronotum slightly longer than vertex, granulate; scutellum acuminate, sparsely granulate toward base; elytral veins with raised spots. *Genitalia: female*, last ventral



segment three times as long as preceding, carinate, and distinctly produced, with a shallow notch at apex; pygofer short, compressed toward the tip, exceeded by the ovipositor, which extends nearly to tip of elytra.

Light yellow; the vertex with fuscous patches in the depressions. Pronotum black with yellow granulations; scutellum black with lateral margins and apex yellow; elytra whitish hyaline, with veins blackish, distinctly marked with light yellow dots, a narrow smoky band near base, a broad band extending from costa and covering the clavus back of the scutellum; wings at apex smoky; face yellow, a broad stripe on each side of the front, enclosing a narrow brownish line extended on to the clypeus, the middle part of which is fuscous with a central yellowish line; the loræ bordered with black; pleural pieces crossed by black bands; legs light brownish, with fuscous annulations. Abdomen black above, yellowish at the margins. Beneath, yellowish, a broad smoky stripe on each side of last ventral segment; the pygofer brownish yellow with a black stripe; ovipositor brown, tipped with black.

Length: 9 mm.

Described from two female specimens, *type*, and *paratype*, from Santarem, Brazil, June and July, 1919, C. M. Acc. No. 6324 (S. M. Klages *coll.*).

This is a very well marked species, approaching *J. cingulatus* and *J. dissolutus* in size, but with a very different picture for elytra and face.

#### 57. *Jassus spinosus* sp. nov.

Head almost as wide as pronotum, bluntly rounded; vertex about as wide as long, with lateral median carinae; front with sides nearly parallel, a distinct median carina; clypeus expanded slightly at tip, elevated at base and carinated toward tip; loræ and cheeks narrow, border of cheek deeply sinuate below the eye. Pronotum as long as vertex, hind border sinuate; elytral veins slightly elevated; hind tibiae with very strong spines. *Genitalia: female*, last ventral segment twice as long as preceding; hind border faintly sinuate, a slight notch at the center.

Rusty brown; beneath slightly paler; a faint fuscous patch at the end of the costal cell.

Length: ♀, 6.5 mm.

Described from a single specimen, *type*, in collection of author, from Bartica, British Guiana, Mar. 20-30, 1901 (H. S. Parish *coll.*).

58. *Jassus dentatus* sp. nov.

♀. Head broad, rounded in front; vertex quadrate, slightly produced before the eyes, with lateral and median carinæ, and shallow depressions between it and the front, including the ocelli; front with sides nearly parallel; apex expanded, sinuate, elevated at base and obtusely carinate toward tip. Pronotum scarcely longer than vertex, granulate; hind border sinuate; scutellum with a broad depression behind the middle, minutely granulate at base; elytral veins slightly raised. ♂, agreeing perfectly with the female in details of structure, but the pronotum, scutellum, front, cheeks and pleural pieces are somewhat darker fuscous. *Genitalia: female*, last ventral segment about three times as long as preceding; deeply incised at the middle, with a broad central tooth, as long as the lateral lobes; *male*, plates rather broad, elongate, strap-like, with longitudinal rugæ and bluntly rounded tips.

Uniformly rusty brown with very faint smoky patches at base of outer anteapical cell; scutellum with fuscous triangles at basal angles and two round fuscous spots on the disk.

Length: female, 7 mm.; male, 6 mm.

Described from one female, *type*, from Villa Bella, Bolivia, Oct. 6, 1907, C. M. Acc. No. 4043 (Haseman *coll.*); and a male, *paratype*, taken along the Guaporé below Rio S. Miguel, Brazil, Aug. 22, 1909, C. M. Acc. No. 4043 (Haseman *coll.*). This is very similar to *J. spinosus*, but the last ventral segment is so totally different, that they must be considered distinct.

There is a second male from Taperina, Brazil, C. M. Acc. No. 2966 (H. H. Smith *coll.*), which is very similar to the above, but with lighter sub-hyaline elytra, having a broad smoky band behind the clavus. It also probably belongs here.

59. *Jassus ater* (Walker.)

*Cælidia atra* Walker, Homoptera, Pt. III, 1851, p. 853.

Head narrower than pronotum, rather short; vertex scarcely as wide as pronotum, wider than long; vertex depressed, with lateral and median carinæ, a transverse carina behind the depressions, including the ocelli; front narrow, with a strong carina; clypeus widening from base toward tip, slightly expanded at tip, the base tumid and apical part carinate; loræ narrowed below; cheeks narrow, deeply sinuate. Pronotum densely granulate; scutellum faintly granulate at base. *Genitalia: male*, plates broad, widening to middle, then narrowing and compressed to blunt tips.

Black; vertex yellowish with fuscous, ocellate dots near base, and

a transverse broken fuscous band anteriorly; ocelli and median depression blackish; borders of the eye, short transverse arcs of front, and the base of clypeus, yellowish. Underside and abdomen black, with pleural pieces and borders of abdominal segments yellowish; fore and middle legs and hind femora, yellowish; hind tibiæ blackish.

Length: 7.5 mm.

Specimens from Chapada, Brazil, C. M. Acc. No. 2966, Jan. (H. H. Smith *coll.*), and San Antonio de Guaporé, Brazil, July 26, 1909; and Rio Guaporé below Rio S. Miguel, Aug. 22, 1901, C. M. Acc. No. 4043 (Haseman *coll.*).

#### 60. *Jassus marginatus* (Stål).

*Cælidia marginata* Stål, Stett. Ent. Zeit., Vol. XXV, 1864, p. 85.

*Jassus marginatus* Spångberg, Species Jassi gen. Homopt., Æfvers. K. Vet. Ak. Förh., Vol. XXXV, No. 8, 1878, p. 20.

Head broad, almost equal to width at pronotum, broadly rounded in front; vertex a little wider than long, scarcely longer in middle than next the eye; ocelli well forward on border between vertex and front; front narrow, faintly carinate; clypeus expanded at tip, slightly elevated on basal half of median line; loræ and cheeks narrow; cheek border sinuate. Pronotum short, as long as vertex; minutely granulate; scutellum broad, acuminate at apex; elytral veins strong, not dotted. *Genitalia: female*, last ventral segment produced at middle, bi-sinuate, strongly carinate; *male*, plates narrow, upturned, compressed at tips.

Black; vertex and face greenish yellow with broad orange-red stripes bordering the front. Pronotum, scutellum, and elytra dark smoky, or blackish; the costal areole and an extension into outer anteapical cell and outer apical areole yellowish; commissural border of clavus brownish. Beneath yellowish, with dark spots on pectus and coxæ. Abdomen above black on the disk, reddish brown on the sides, yellowish brown beneath. In the males the colors are generally darker, the thorax and abdomen beneath largely black; legs yellowish or light-brown; hind tibiæ and the tarsal joints somewhat marked with fuscous.

Length: ♀, 6.5 mm.; ♂, 5.5 mm.

One female specimen from Mana River, French Guiana, May, 1917, C. M. Acc. No. 6008 (Klages *coll.*) is referred to this species. The collection of the author includes a number of specimens from Pt. Barrios, Los Amates, and Mazatenango, Guatemala, collected during February and March, 1905, by Prof. J. S. Hine.

The description of the male is drawn from one of these specimens. The females are distinctly lighter colored, but otherwise apparently



identical, and it is possible that the lack of coloring indicates immaturity instead of variation.

Stål described this species from Mexico. These records carry the species through Central America and northern South America to the Guianas. The species resembles *J. melanotus* Spg., of the southern United States. The vertex appears shorter, but the genitalia are quite similar, and it is possible that, with collections in intermediate territory, it will be found that the species are one, with a continuous distribution from Ohio to South America, accompanied by variations in color.

#### 61. *Jassus interruptus* sp. nov.

Head rather narrow, somewhat produced before the eyes; vertex widening from base to anterior border, slightly longer at middle than next the eyes, with lateral and median carinæ; ocelli in a depression between carina of vertex and base of front; front narrow, with transverse rugæ, and a scarcely visible median carina; clypeus long, twice as long as width at base, expanded at apex, tip truncate; loræ narrowed below; cheeks deeply sinuate below the eye. Pronotum a little longer than vertex, broadly sinuate behind, distinctly granulate; scutellum acuminate, sparsely granulate at base; elytral veins raised. *Genitalia: male*, plates narrow at base, widening and distinctly compressed toward the tip; apex rounded, reaching tip of pygofer.

Fuscous, or blackish; vertex dull yellowish with numerous fuscous dots, and three blackish patches across the disk; and a transverse bar behind the ocelli. Pronotum and scutellum black, with the granulations yellow; elytra dark brown, or fuscous; smoky toward the tip, an indistinct broken band across middle of clavus, and a more distinct broken band of fulvous spots crossing the tip of clavus; elytral veins and costal area with numerous yellow dots; front black, with broken transverse arcs yellowish; clypeus black, margin and lateral spots near apex yellowish; loræ and cheeks mostly black, with dull yellow borders; thorax and abdomen black; margins of the pleural pieces, the abdominal segments, and the legs mostly light brown or yellowish.

Length: 9 mm.

One male specimen, *type*, from Province del Sara, Bolivia, 450 M., C. M. Acc. No. 6443 (Steinbach *coll.*). This species approaches *J. cingulatus* Stål, but the carina of front is much smaller and the genital plates narrower than in the males of that species.

62. *Jassus pallidus* sp. nov.

Head narrower than pronotum, distinctly arched, rounded in front; vertex slightly longer than width at base, disk depressed, forming lateral and median carinæ; ocelli set between transverse ridges; front narrow, a distinct central carina; clypeus nearly twice as long as width at base, a little widened at tip; apex convex; loræ and cheeks narrow; cheek margins deeply sinuate under the eyes. Pronotum longer than vertex, minutely granulate; scutellum smooth, polished; elytral veins slightly raised. *Genitalia: male*, plates long, boat-shaped; widening to the middle, then narrowing to blunt points.

Almost uniformly light brown, below a little paler, tinged with yellow; male plates brown; elytral veins with faint elongate yellowish dots; ocelli, eyes, and tarsal claws, blackish.

Length: 7 mm.

Described from one male specimen taken on the Rio Guaporé, near Ft. Principe, Brazil, Aug. 25, 1909, C. M. Acc. No. 4043 (Hase-man coll.).

This is a very light-colored species, possibly immature, although in all details of structure it appears fully matured.

63. *Jassus ampliatus* sp. nov.

Broad; head narrower than pronotum, broadly rounded; vertex about as long as wide, disk with two depressions on each side, a faint median carina; ocelli in slight depressions; front strongly carinate; clypeus narrow at base, widening to tip; a distinct median carina; tip truncate; loræ sharply angled below; cheek narrow. Pronotum short, scarcely longer than vertex, distinctly granulate; scutellum minutely granulate at base; elytra very broad; apex broadly rounded. *Genitalia: female*, last ventral segment twice as long as preceding; rather deeply excavated within the lateral angle, middle part somewhat produced and broadly notched and carinate; *male*, plates flat, rather narrow, at base, widening to center, then narrowed to acute tips, the outer part partially twisted, so as to form a keeled structure.

Dull black or deep fuscous; vertex ivory-white, faintly marked with fuscous in the depressions; ocelli black; front at base ivory-white, merging into red-brown; the disk black, with numerous sharp reddish arcs, base of clypeus ferruginous; rostrum yellowish. Pronotum, scutellum, and elytra dull black; elytra with obscure rusty-brown patches on clavus and disk; costal areole black, veins dotted with dull rusty brown; wings brownish smoky. Beneath, thorax and abdomen black, with pleural pieces and abdominal segments narrowly margined with yellow or brown. In the male, the plates are

dull brown; legs black; fore and middle tibiae, apex of hind tibiae, and tarsi, mostly brownish.

Length: female, 7 mm.; male, 7 mm.

Described from two specimens, one a female, *type*, from Las Juntas, Bolivia, Dec., 1913, C. M. Acc. No. 5066 (Steinbach *coll.*); and one male, *paratype*, from Province del Sara, Bolivia, 450 M., Nov., 1909, C. M. Acc. No. 4549 (Steinbach *coll.*).

These specimens agree so perfectly in every detail of structure and coloration, that it seems perfectly safe to connect them as the sexes of one species, although they were taken at different localities and at different times.

#### 64. *Jassus foveatus* sp. nov.

Head narrower than pronotum; vertex as long as wide, contracted at base, widening at front of eyes; disk depressed; margins elevated, a median carina forked and becoming obsolete anteriorly, with two elevations near the eye, a strong anterior carina, forming distinct depressions for the ocelli, between which there is a double fovea; front elongate, ovate; margins slightly raised, median carina distinct; clypeus long, more than twice as wide as width at base, distinctly widened at tip; apex truncate; lorae elongate, sharply angular above and below, cheeks narrow, deeply sinuate beneath the eye. Pronotum as long as vertex, rather coarsely granulate; scutellum minutely granulate on the disk; base and angles polished, very minutely granulate; tip minutely rugose; elytra broad; apex rounded. *Genitalia*: *male*, plates long, nearly flat, each with a strong polished acute tubercle at base, rather thin, flattened, narrowed toward the tip to a bluntly rounded apex, reaching tip of pygofer.

Light brown; vertex with fuscous dots on the disk; ocelli whitish; front ferruginous with short lateral arcs, and antennal pits fuscous. Pronotum piceous, brownish at the sides; scutellum piceous-black; tip brownish; elytra brownish, with smoky, fuscous, somewhat iridescent border, extending as a band across the disk before the cross-veins, and reaching the costa on base of outer apical cell; veins with faint yellowish dots on clavus and within the smoky band.

Length: 4.5 mm.

Described from one male specimen, *type*, Taperina, Brazil, C. M. Acc. No. 2966 (H. H. Smith *coll.*).

#### 65. *Jassus loricatus* sp. nov.

Head narrower than pronotum, moderately arched; vertex as long as wide, slightly divergent anteriorly, disk depressed, lateral and median carina distinct, and a low ridge anteriorly behind ocelli, and a shallow median depression between the ocelli; front with sides



almost parallel; a distinct median carina; clypeus nearly twice as long as wide, slightly expanded at tip; apex rounded or sub-truncate; loræ narrow below, margins of cheeks sinuate. Pronotum as long as vertex, distinctly granulate; scutellum acuminate, basal part granulate. *Genitalia: male*, plates large, longer than all preceding segments of abdomen taken together, widened to the middle, coarsely rugose, narrowed and somewhat compressed apically; tips bluntly angular, reaching tip of the pygofer.

Vertex pale fulvous or yellowish, with margins ivory-whitish; ocelli black; front ferruginous, with transverse arcs and central stripe, black; clypeus ferruginous, with discal patches toward the apex; loræ brown, with fuscous disks; cheeks at base somewhat infuscated. Pronotum and scutellum black; elytra brownish, subhyaline, more opaque and fuscous at base, and with a broad fuscous band beginning with outer apical cell and widening to the inner margin, where it covers from the end of the first claval vein to more than half of the appendix; veins with very faint yellowish spots, most evident in the dark band of the outer part. Beneath brownish; base of abdomen fuscous; genital plates brown; legs mostly brownish; tips of tibiæ and tarsal claws darker.

Length: 6.5 mm.

Described from one male specimen, *type*, San Antonio, Bolivia, July 26, 1909, C. M. Acc. No. 4043 (Haseman *coll.*).

#### 66. *Jassus carinatus* sp. nov.

Head broad, not as wide as pronotum, bluntly rounded to front; vertex as long as wide, slightly widened at apex, disk depressed; carina conspicuous, an elevated spot near base and deep depressions on each side of ocelli, and a shallow depression between them; front flat, distinctly carinate; clypeus twice as long as basal width, expanded at tip, apex truncate, basal part with a slight elevation becoming carinate on center, and reaching two-thirds the length. Pronotum short, as long as vertex, rather coarsely granulate; scutellum acuminate, granulate at base; elytra broad, slightly passing the ovipositor. *Genitalia: female*, last ventral segment with lateral angles slightly produced, hind margin sinuate, a narrow deep notch and a prominent median carina; pygofers short, reaching about two-thirds length of the ovipositor.

Brownish fuscous; vertex pale brown, the carina lighter; ocelli whitish; front brown, median carina black, with two spots near center, transverse arcs dark fuscous; clypeus pale brown at base; disk and central apex brownish; lateral lobes dark fuscous; loræ black; cheeks brown. Pronotum piceous on the central part, pale brown laterally, with yellowish granules; scutellum brown, with fuscous patches at base and apex; elytra dark brown, nervures dark

fuscous, with numerous light brown or yellowish elongate dots; a paler spot on clavus at end of second nerve, and another at tip of clavus on base of membrane.

Length: 7 mm.

One female specimen, *type*, Rio de Janeiro, Brazil, August, C. M. Acc. No. 2966 (H. H. Smith *coll.*). A second specimen, taken on the Rio Guaporé, near Ft. Principe, Aug. 25, 1909, C. M. Acc. No. 4043 (Haseman *coll.*), agrees very closely with the type, but the costal area is darker and includes a lighter patch toward the end of the outer anteapical cell. It is also somewhat lighter colored, but the picture of face and elytra appear to be the same.

#### 67. *Jassus dubius* sp. nov.

Similar to *J. carinatus*, but darker, and with two distinct bands on elytra; head broad, bluntly rounded; vertex with prominent carina, a basal elevation on the disk on each side; ocelli with depressions on each side and a shallow one between; front rather narrow, distinctly carinate; clypeus twice as long as wide, tip expanded, or truncate, a distinct elevation, or median carina, extending to the tip. Pronotum scarcely longer than vertex, distinctly granulate; scutellum acuminate, sparsely granulate, and minutely rugose at base; elytra broad, short, extending a little beyond the end of abdomen. *Genitalia: male*, plates narrow at base widening slightly to middle, then narrowed to blunt tips, the outer three-fourths somewhat inclined; tips slightly divergent, extending beyond tip of pygofer.

Mostly black; vertex pale; pronotum, scutellum, and elytra black, with yellowish granules and dots; the elytra with two sub-hyaline bands, one just beyond tip of scutellum, the other behind tip of clavus. Beneath black; margins of front and transverse arcs, and two or three dots on the carina, testaceous; base and carina of clypeus, brown; margins of pleural pieces and abdominal segments yellowish; legs black, fore and middle tibiae and apical part of hind tibiae paler.

Length: 6.25 mm.

One male specimen, Province del Sara, Bolivia, C. M. Acc. No. 5064 (Steinbach *coll.*); two male specimens from the same locality, 450 M., Nov., 1909, C. M. Acc. No. 4549 (Steinbach *coll.*).

This form agrees so closely with the female of *J. carinatus* that it seems quite likely to belong with that species, but, aside from the quite different locality, the difference in the carina of the clypeus, and the presence of two distinct transverse bands, suggest that it may be distinct; and, until definitely connected with that species, it had better be placed under a separate name.

68. *Jassus cinnamomeus* sp. nov.

Head narrower than pronotum, sub-angulate in front; vertex slightly produced, a little longer than wide, margins slightly divergent, feebly carinate, median carina obsolete in front, transverse carina including ocelli and a shallow depression at the middle; front narrow, flat, a distinct median carina; clypeus twice as long as wide, with a median elevation extending beyond the middle; tip expanded and truncate; loræ and cheeks narrow. Pronotum as long as vertex, rather sparsely granulate, hind border nearly truncate; elytra long, rather narrow. *Genitalia: male*, plates rugose at base, widening to the middle, distinctly carinate, compressed, and bluntly rounded at apex, which extends beyond tip of pygofer.

Dark fuscous or brown; the vertex, pronotum, and scutellum rather deep fulvous, tinged with cinnamon; front, loræ, and clypeus reddish brown; cheeks mostly fuscous; elytra dark fuscous, with two bands, one back of the scutellum, which is distinctly angulate, the other nearly transverse across tip of clavus; veins dotted with yellow, entire elytra tinged with cinnamon. Beneath, black; borders of pleural pieces and abdominal segments yellowish; legs brown; base of hind tibiæ and the tarsal claws fuscous.

Length: 7.5 mm. to 7.75 mm.

Two male specimens, one, *type*, Province del Sara, Bolivia, C. M. Acc. No. 5064, Oct., 1913; and one, *paratype*, Province del Sara, Bolivia, 450 M., C. M. Acc. No. 4549 (Steinbach coll.).

This species appears to be related to *J. conspersinervis*, but the genital plates and the color of the face are quite different. The cinnamon tinge, if constant, is a good diagnostic character.

69. *Jassus triangularis* sp. nov.

Head broad, moderately arched; vertex quadrate, scarcely exceeding the eyes; lateral and median carinæ distinct; anterior carina weak; ocellar fovæ shallow; front yellow, sides parallel; clypeus nearly twice as long as width at base, scarcely expanded at tip; front and clypeus both with median carina; cheeks narrow, margins slightly sinuate. Pronotum a little wider than vertex, rather sparsely and coarsely granulate; scutellum granulate at base; elytra passing beyond abdomen. *Genitalia: male*, plates narrow at base, strongly carinate, expanded toward tips, narrowing to blunt apex.

Dark above, pale below; vertex whitish, with depressed areas suffused with brown; face dull yellow, the frontal arcs brownish. Pronotum, scutellum, and elytra mostly dark fuscous or blackish, granulations yellow; a triangular hyaline spot on costa; the apical part smoky, subhyaline; veins dotted with yellow; a series of irregular sub-hyaline patches extend across the clavus, and there is a sub-



hyaline patch at base of membrane. Beneath uniformly dull straw-colored or yellowish; tarsal claws dark; male plates brownish.

Length: 5.75 mm.

Described from one male specimen, *holotype*, from the banks of the Rio Guaporé below Rio S. Miguel, Brazil, Aug. 22, 1909, C. M. Acc. No. 4043 (Haseman coll.).

This species is about the size and has the general appearance of *D. flavicosta* Stål, but is much paler below and the carinæ of head are less prominent.

#### 70. *Jassus bisinuatus* sp. nov.

Small, broad; head broadly rounded; vertex short, wider than long; carina weak; front narrow, sides nearly parallel; median carina distinct; clypeus short, elevated on the middle; scarcely expanded at tip, truncate; loræ elongate; margin of cheek sinuate. Pronotum a little longer than vertex, granulate; elytra broad, short, broadly rounded at tips, reaching tip of ovipositor. *Genitalia: female*, last ventral segment long, hind border deeply sinuate on each side; lateral angles and central lobe equally produced; ovipositor extending beyond tip of pygofer about one-fourth of its length.

Dark brown, or blackish; vertex brown, carina darker. Pronotum and scutellum margined with brown; elytra dark fuscous; a large triangular area extending from costa nearly to clavus, light brown, subhyaline; apex smoky with subhyaline areas; veins spotted with yellowish; front brown at base, black at apex, with alternating reddish and black arcs; clypeus brown, with fuscous margins; face mostly fuscous; legs brown.

Length: 6 mm.

Described from one female specimen, *type*, collected at Santarem, July, 1919, C. M. Acc. No. 6324 (S. M. Klages coll.).

This may very probably be the female of *J. tubus*, with which it agrees closely in the color-pattern, but it cannot with certainty be referred to that species.

#### 71. *Jassus tubus* sp. nov.

Small, robust; head nearly as wide as pronotum, broadly rounded in front; vertex about as long as wide, carina rather weak; ocellar pits shallow; front with sides nearly parallel; median carina distinct; clypeus twice as long as width at base, elevated on the middle, slightly expanded, truncate at tip; loræ narrow, cheeks moderately sinuate. Pronotum scarcely as long as vertex; hind border sinuate; elytra broadly rounded at tip, extending beyond the tip of abdomen. *Genitalia: male*, plates widening a little from the base, taken together, they are tubular in form, the tips blunt.

Black and brown; vertex light brown, with ivory-yellowish margins and carina; ocelli black, base of front reddish brown; disk and apical portion black; arcs light brown; clypeus reddish brown with blackish margins; loræ and cheeks black, narrowly margined with paler. Pronotum black, with reddish brown granules; scutellum black, margined with brown; elytra dark fuscous, with a large brown opaque area, extending from costa to near the clavus; apex brownish; veins spotted with reddish brown. Beneath, pleural pieces and coxæ black, with yellowish brown borders; abdomen reddish brown; legs with coxæ, most of femora, and hind tibiæ, blackish.

Length: 5.5 mm.

Described from one male specimen, *holotype*, Pied Saut, Oyapok River, French Guiana, Dec., 1917, C. M. Acc. No. 6111 (S. M. Klages coll.). This species resembles *J. bisinuatus* in the color-pattern, and may possibly be the male of that species.

## 72. *Jassus flavifrons* sp. nov.

Head short, vertex narrowed at base, broadly rounded at front; front long, narrowed below the eyes; truncate at tip, without carina; clypeus elevated at base, obtusely carinate toward tip; apex slightly expanded, truncate; loræ narrow; cheeks narrow, slightly sinuate. Pronotum nearly twice as long as vertex, strongly arched between the eyes, hind border nearly straight; scutellum acuminate. *Genitalia*: *male*, plates narrow, bent upward at middle, scarcely widened apically, tips obtuse.

Black, minutely dotted with yellow; vertex black, margined narrowly with yellowish next the eye; front, except at base, and basal half of clypeus, ivory-yellow; apex of clypeus testaceous, the borders black; loræ and cheeks black. Pronotum, scutellum, and basal half of elytra minutely dotted with dark yellow, elytra merging into fuscous brown on the apical half; beneath black, fore and middle legs with apex of femora, tibiæ, and tarsi, light brown; hind legs black; base of first tarsal joint brownish; tarsal claws blackish.

Length: male, 7.5 mm.

Described from numerous specimens from Coroico Yungas, among them the *type*, and Chulumani, Bolivia, *paratypes*, in the collection of the author and in the Carnegie Museum.

This well marked species seems distinct from any of the described forms, although occurring in a region from which a number of species have been described.

## Genus NEOCÆLIDIA Gillette and Baker.

*Neocælidia* Gillette and Baker, Hemiptera of Colorado, 1895, p. 104.

73. *Neocœlidia ornata* sp. nov.

Head short, scarcely produced, narrower than pronotum; vertex wider than long, as long at middle as next the eye; ocelli considerably below the middle of the eye, three times their diameter from the eye; antennæ extremely long, longer than entire insect, the outer part of setæ very delicate and irregularly bent and twisted; front somewhat inflated, narrowed abruptly at tip; clypeus short, scarcely longer than wide, widening toward the tip, apex truncate; loræ broad, approaching border of cheek; cheeks broad. Pronotum short, one-half longer than vertex, lateral borders curved, hind border faintly sinuate; elytra long, narrowing to apex, appendix narrow. *Genitalia: male*, plates short, tumid; tips compressed, and bluntly rounded.

Light yellow, with the hinder border of pronotum and cheek, lateral and apical portion of scutellum, a broad discal and apical spot on clavus, an elongate basal spot on corium, a transverse discal spot from sub-costa to claval suture touching apical spot on clavus, two somewhat oblique spots on anteapical cells, orange-red; a darker orange band bordered with fuscous on anteapicals; four blackish dots on apical veins; apical areoles smoky; wings milky subhyaline. Beneath, pale creamy; tarsal claws dusky.

Length: 6.75 mm.

This very ornate species is represented by a single specimen from Valparaiso (2500 ft.) Dept. of Magdalena, Colombia, July, 1898, C. M. Acc. No. 1999 (H. H. Smith coll.).

This species differs from any other of the genus in the short vertex and the position of the ocelli. The antennal setæ are even longer than is usual in this genus, and it is possible that with additional material at hand it may prove proper to set it apart as constituting a separate genus.

Genus EUGNATHODUS Baker.

*Eugnathodus* Baker, *Invertebrata Pacifica*, Vol. I, 1903, p. 1.

74. *Eugnathodus lineatus* sp. nov.

Head slightly wider than pronotum, strongly arched and sub-angulate; vertex a little produced, about one-third longer at middle than next the eye, more distinctly angulate with front than in other species; front narrowing uniformly to clypeus; clypeus nearly twice as long as wide, apex slightly rounded; loræ not reaching margin of cheek; cheeks broad, sub-angulate; propleura narrow. Pronotum strongly arched before, a little more than twice as long as vertex; hind border slightly concave; scutellum rather small. *Genitalia: female*, last ventral segment a little longer than preceding; hind border truncate; a transparent indentation gives the appearance of a central tooth.



Creamy white. Pronotum with three fulvous lines, the middle one extending through the scutellum; there are faint fulvous lines on the clavus and corium, and a dusky patch at tip of clavus and on the outer apical cell.

Length: 3 mm.

Described from four female specimens, *type* and *paratypes*, from Province del Sara, Bolivia, Nov., 1912, C. M. Acc. No. 5064 (Steinbach *coll.*).

The narrowness of the propleura would seem to relate this form to *E. flavescens*, but the head is much more depressed and the lines of the pronotum will readily distinguish it.

#### 75. *Eugnathodus flavescens* Baker.

*Eugnathodus flavescens* Baker, Invertebrata Pacifica, 1903, Vol. I, p. 2.

Baker's description of this species reads:

"Propleura behind eye so narrow that hind margin almost touches eye; body small, short, and thick set; color opaque yellowish throughout; length 2.5 mm., Managua, Nicaragua."

Head scarcely wider than pronotum, rather distinctly arched; vertex a little longer at middle than next the eye; front broad, slightly elevated medially toward the tip; loræ rather short, not reaching apex of cheek; border of cheek sinuate; propleura excavated behind. Pronotum strongly arched in front, about three times as long as vertex. *Genitalia: female*, last ventral segment about twice as long as preceding; hind border sinuate.

Light yellow; eyes dark brown; elytra subhyaline.

Length: 2.6 mm.

One specimen Santarem, Brazil, Dec., 1909, C. M. Acc. No. 4043 (Haseman *coll.*).

#### 76. *Eugnathodus lacteus* Baker.

*Eugnathodus lacteus* Baker, Invertebrata Pacifica, Vol. I, 1903, p. 2.

Head short, broad, scarcely wider than pronotum, broadly arched in front; vertex short, as long at center as at eye; front broad, obtusely carinate below; clypeus nearly twice as long as width at base; loræ broad, outer margin rounded, reaching border of cheek; cheeks broad. Pronotum moderately arched in front, about four times as long as vertex; hind border slightly convex. *Genitalia: female*, last ventral segment truncate, color-markings appearing like a tooth at center; *male*, valve short, triangular; plates broad at base, narrowed abruptly and extended in two long, slender, upcurved processes.

Dull milky white. Beneath, pale gray, somewhat tinged with yellow.

Length: 3.5 to 3.75 mm.

This description is drawn from a series of fifteen specimens from Province del Sara, Bolivia, Feb., 1913, C. M. Acc. No. 5064 (Steinbach *coll.*).

These specimens appear to fit the brief description by Baker which reads:

"Size medium; length 3.5 mm.; head and pronotum yellowish white; elytra translucent milky white, Managua, Nicaragua."

If our determination is correct, it gives this species a range from Central America to central South America.

#### Genus ALEBRA Fieber.

*Alebra* Fieber, Kat. Europ. Cicad., 1872, p. 14.

#### 77. *Alebra terminalis* sp. nov.

Head scarcely as wide as pronotum, slightly produced; vertex a little wider than length at middle, slightly longer at middle than next the eye, rounded to front; ocelli near border of eye; front narrowed and tapering to clypeus; clypeus narrowed toward tip; loræ touching border of cheek; cheeks narrow. Pronotum twice as long as vertex, concave behind. *Genitalia: male*, last ventral segment a little longer than preceding, hind border concave; plates narrower than hind segment, with deep depressions on disk, narrowing at middle to compressed, slender, bluntly rounded tips.

Brilliant golden yellow above; vertex light yellow. Pronotum with three light yellow bars behind middle; elytra bright orange-yellow to end of clavus, with milky subhyaline yellowish areas on clavus and central part of corium; apex of elytra beyond tip of clavus glassy hyaline with black veins; three black cross-nervures toward tip, and a broad smoky apical band; face, thorax below, and legs, pale yellowish; venter sulphur-yellow; male plates brownish at tips.

Length: 3.75 mm.

Described from one male specimen, *type*, Province del Sara, Bolivia, Nov., 1912, C. M. Acc. No. 5064 (Steinbach *coll.*).

This is a very handsome species, the brilliant orange, or golden yellow, of the pronotum and elytra extending to tip of clavus, contrasting sharply with the hyaline apex.

#### Genus EMPOASCA Walsh.

*Empoasca* Walsh, Proc. Bost. Soc. Nat. Hist., Vol. IX, 1864, p. 315.

78. *Empoasca picta* sp. nov.

Head produced; vertex narrow, about one-half longer at middle than next the eye; front elongate, narrowing gradually to clypeus; clypeus broad, rounded at tip; loræ narrow; cheeks narrow, outer border nearly straight, reflexed. Pronotum short, half longer than vertex; hind border truncate; lateral margins concave. *Genitalia: male*, last ventral segment narrowed, about as long as preceding; plates narrow, triangular; tips acute.

Brilliant blue-green, with conspicuous orange-red markings. A broad band on base of vertex, a broad border on the front, merging on clypeus, which is lighter yellowish, two basal spots on pronotum; inner border of clavus and three elongate spots, one at base of clavus and one on basal disk of corium, and a third just beyond the middle, orange-red. Two lighter yellowish spots on base of scutellum; elytra beyond the clavus hyaline, somewhat suffused with smoky. Beneath yellowish green, bases of tibiæ tinged with orange-red.

Length: 3.25 mm.

Described from one male specimen, *type*, from Santarem, Brazil, Dec. 10, 1909, C. M. Acc. No. 4043 (Haseman *coll.*).

79. *Empoasca decorata* sp. nov.

Very similar to *E. picta*; head slightly wider than pronotum, strongly arched, somewhat produced, about one-third longer at middle than next the eye; front narrow, elongate; loræ and cheeks narrow; border of cheek nearly straight. Pronotum strongly arched in front, scarcely concave behind. *Genitalia: male*, last ventral segment narrowed, about as long as preceding; hind border lightly sinuate; plates narrow, elongate; triangular; tips upturned and acute, the disk with strong setæ.

Blue-green, pattern similar to that of *E. picta*, but the entire upper part of head, including eyes, bright red; lateral borders of front and the clypeus, base of pronotum, a broad stripe on the clavus interrupted at about the middle, an oval spot near base, and an elongate stripe opposite outer half of clavus, red; elytra beyond the clavus hyaline, faintly tinged with smoky, veins whitish; disk of abdomen black, margined with reddish. Beneath, pale green; tips of hind tibiæ and the tarsi blue-green.

Length: 3.5 mm.

Described from one male specimen, *holotype*, Ft. Principe, Rio Guaporé, Brazil, Aug. 26, 1909, C. M. Acc. No. 4043 (Haseman *coll.*).

This species is very much like *E. picta*, but the red border of the front is absent at the base, and the spots on the elytra are a little differently arranged; the male plates are more acute and spine-like;



these features, with the difference in locality, make it seem advisable to regard the two as separate species.

80. **Empoasca mali** LeBaron.

*Tettigonia mali* LeBaron, Prairie Farmer, 1853, XIII, p. 330.

*Empoasca mali* Osborn, Proc. Iowa Acad. Sci., I, Pt. 2, 1892, p. 126.

*Empoasca mali*, Gillette, Proc. U. S. Nat. Mus., XX, 1898, p. 744.

Bright green; elytra transparent; head a little wider than pronotum, somewhat produced, about one-third longer at middle than next the eye; vertex with greenish whitish dots on the disk. Pronotum with six whitish dots on the anterior border; elytra green, hyaline; below yellowish green; hind tibiæ and tarsi bluish green.

Length: 2.5 mm. to 3 mm.

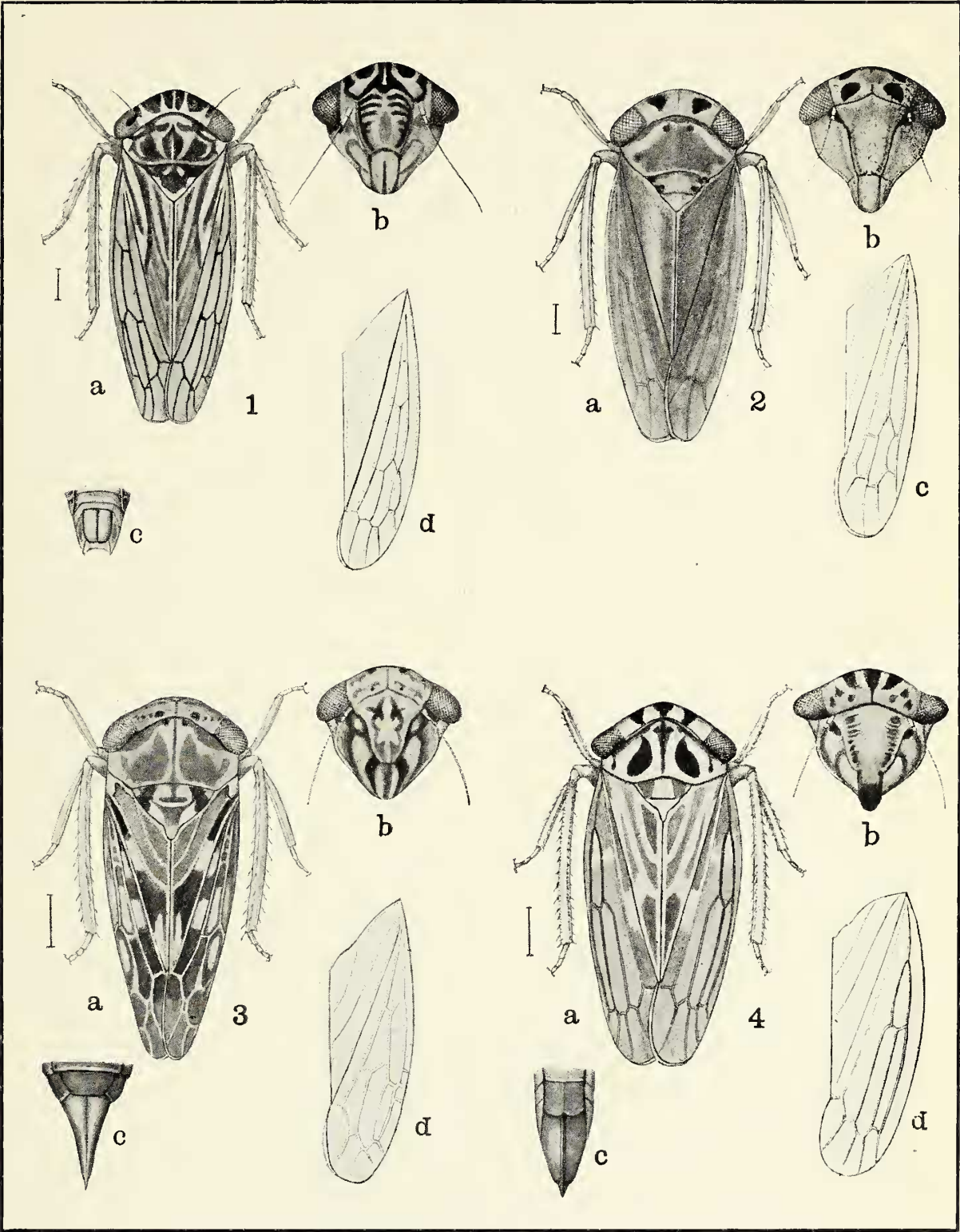
Several specimens from Province del Sara, Bolivia, C. M. Acc. No. 5064, Nov., 1912 (Steinbach coll.).

These specimens agree very well with some of the forms common throughout the United States and southward. The species is one of very wide range, and in the United States is of special importance as an economic pest, particularly as it serves as a carrier for the disease of potatoes, known as "hopper-burn."

## EXPLANATION OF PLATE LV.

Figures reproduced from drawings by Madame Thérèse Ekblom of the types in the Naturhistoriska Riksmuseet at Stockholm.

- FIG. 1. *Agallia signata* (Stål). (See p. 385).  
a, dorsal view; b, face; c, male genitalia; d, elytron.
- FIG. 2. *Agallia peregrinans* (Stål). (See p. 387).  
a, dorsal view; b, face; c, elytron.
- FIG. 3. *Agallia punctaticollis* (Stål). (See p. 384).  
a, dorsal view; b, face; c, male genitalia; d, elytron.
- FIG. 4. *Agallia assimilis* (Stål). (See p. 386).  
a, dorsal view; b, face; c, female genitalia; d, elytron.



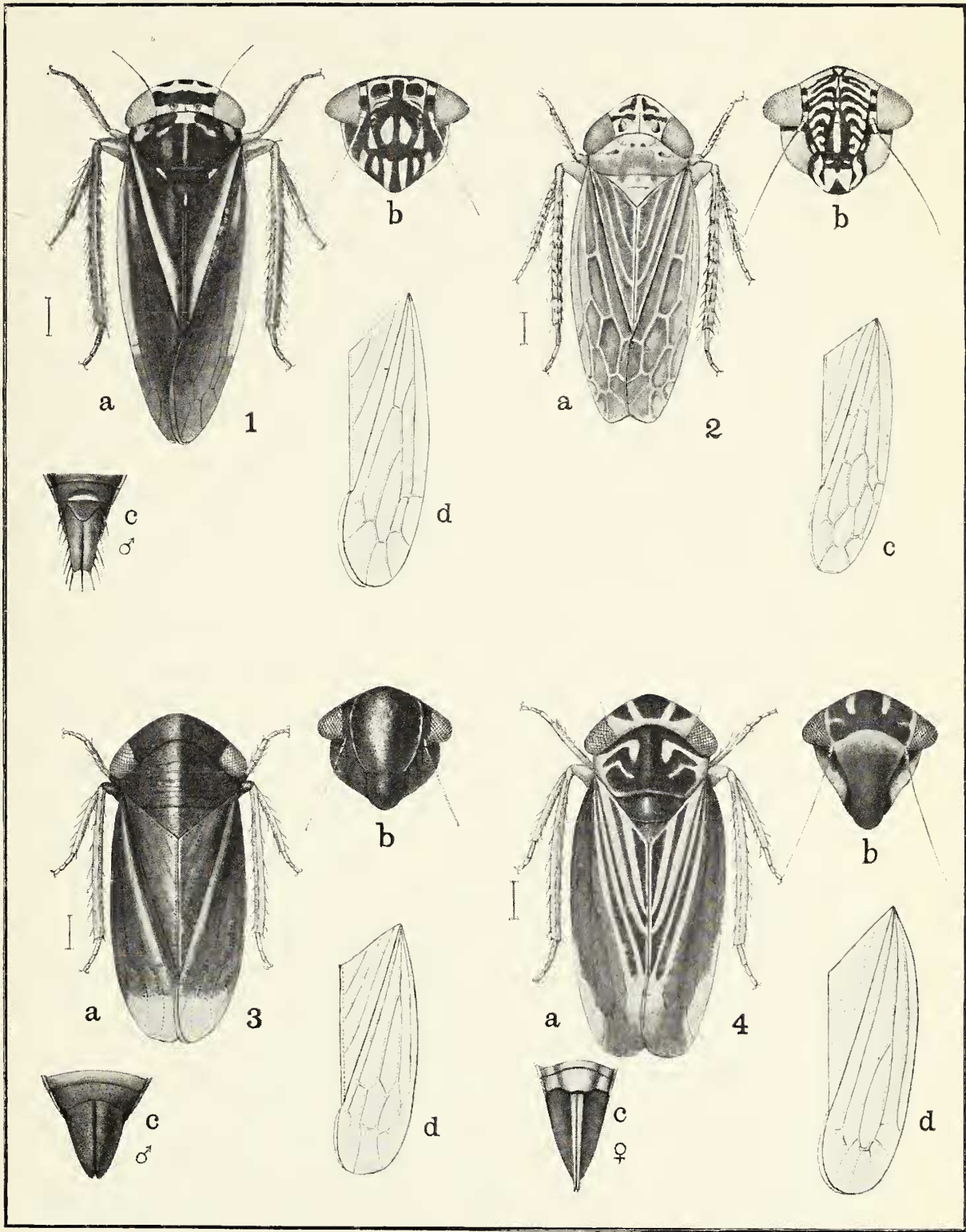
*Agallia.*



## EXPLANATION OF PLATE LVI.

Figures reproduced from drawings by Madame Thérèse Ekblom of the types in the Naturhistoriska Riksmuseet at Stockholm.

- FIG. 1. *Thamnotettix luctuosus* Stål. (See p. 418).  
a, dorsal view; b, face; c, male genitalia; d, elytron.
- FIG. 2. *Deltocephalus faminei* Stål. (See p. 411).  
a, dorsal view; b, face; c, elytron.
- FIG. 3. *Nionia postica* (Stål). (See p. 403).  
a, dorsal view; b, face; c, male genitalia; d, elytron.
- FIG. 4. *Agallia phalerata* (Stål). (See p. 386).  
a, dorsal view; b, face; c, female genitalia; d, elytron.



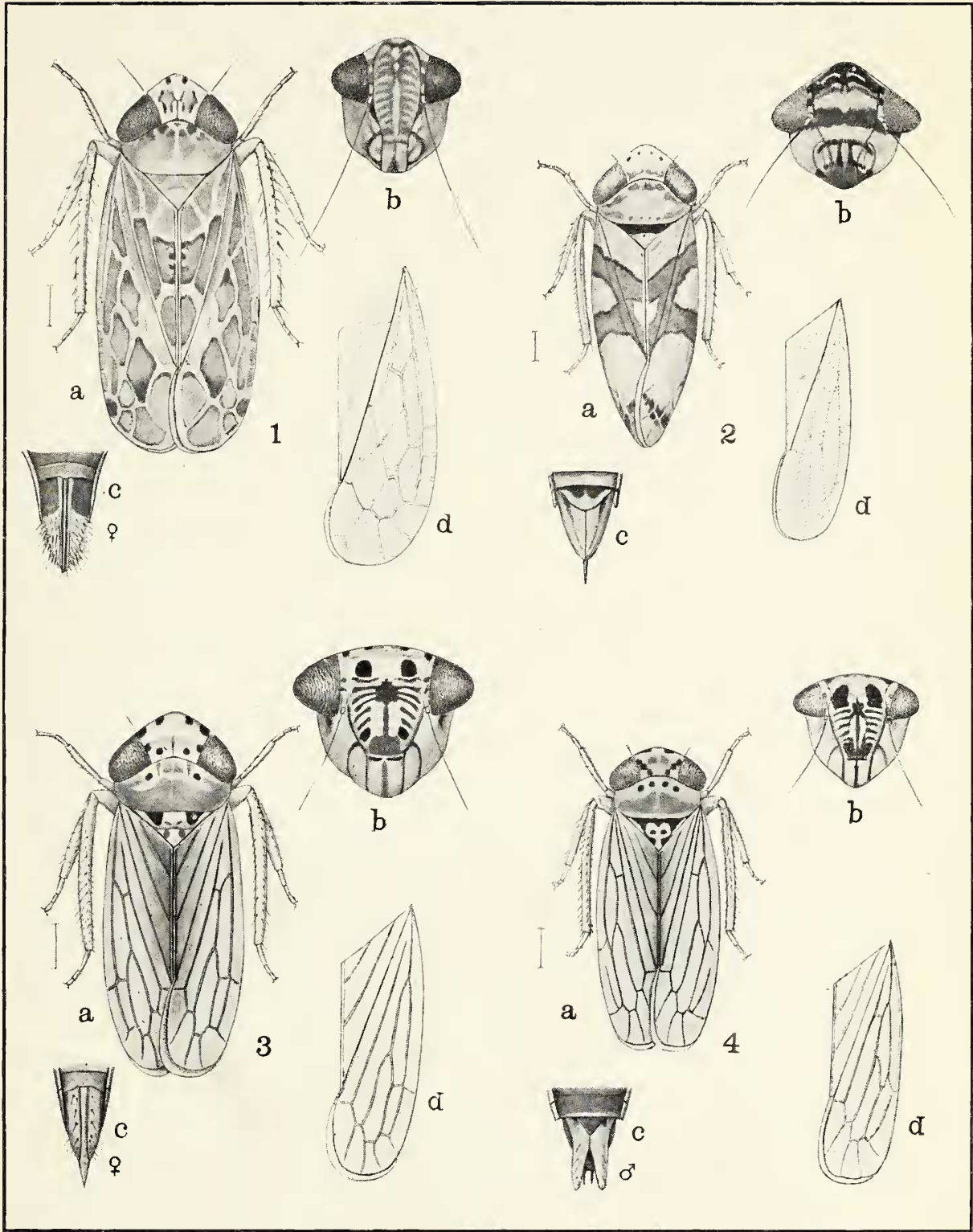
*Thamnotettix, Deltocephalus, Nionia, Agallia.*

## EXPLANATION OF PLATE LVII.

Figures reproduced from drawings by Madame Thérèse Ekblom of the types in the Naturhistoriska Riksmuseet at Stockholm.

- FIG. 1. *Deltocephalus lepidellus* Stål. (See p. 408).  
a, dorsal view; b, face; c, female genitalia; d, elytron.
- FIG. 2. *Scaphoideus ornatipennis* (Stål). (See p. 407).  
a, dorsal view; b, face; c, female genitalia; d, elytron.
- FIG. 3. *Euscelis obscurinervis* (Stål). (See p. 412).  
a, dorsal view; b, face; c, female genitalia; d, elytron.
- FIG. 4. *Euscelis obscurinervis* (Stål). (See p. 412).  
a, dorsal view; b, face; c, male genitalia; d, elytron.



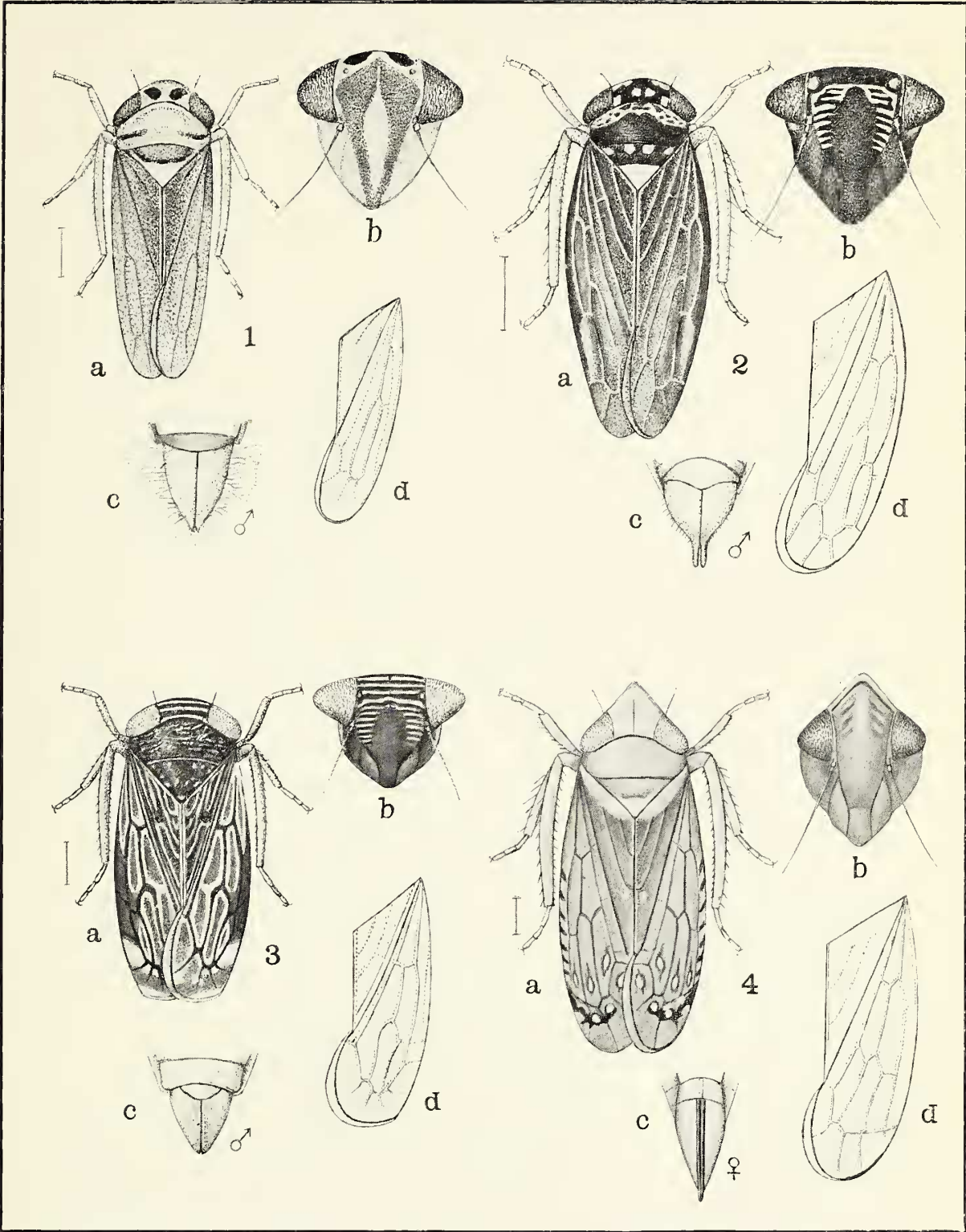


*Deltocephalus, Scaphoideus, Euscelis.*

## EXPLANATION OF PLATE LVIII.

Figures reproduced from drawings by Madame Thérèse Ekblom of the types in the Naturhistoriska Riksmuseet at Stockholm.

- FIG. 1. *Thamnotettix hyalinipennis* Stål. (See p. 423).  
a, dorsal view; b, face; c, male genitalia; d, elytron.
- FIG. 2. *Thamnotettix serius* Stål. (See p. 417).  
a, dorsal view; b, face; c, male genitalia; d, elytron.
- FIG. 3. *Euscelis palliditarsis* (Stål). (See p. 413).  
a, dorsal view; b, face; c, male genitalia; d, elytron.
- FIG. 4. *Deltocephalus anticus* Stål. (See p. 409).  
a, dorsal view; b, face; c, female genitalia; d, elytron.



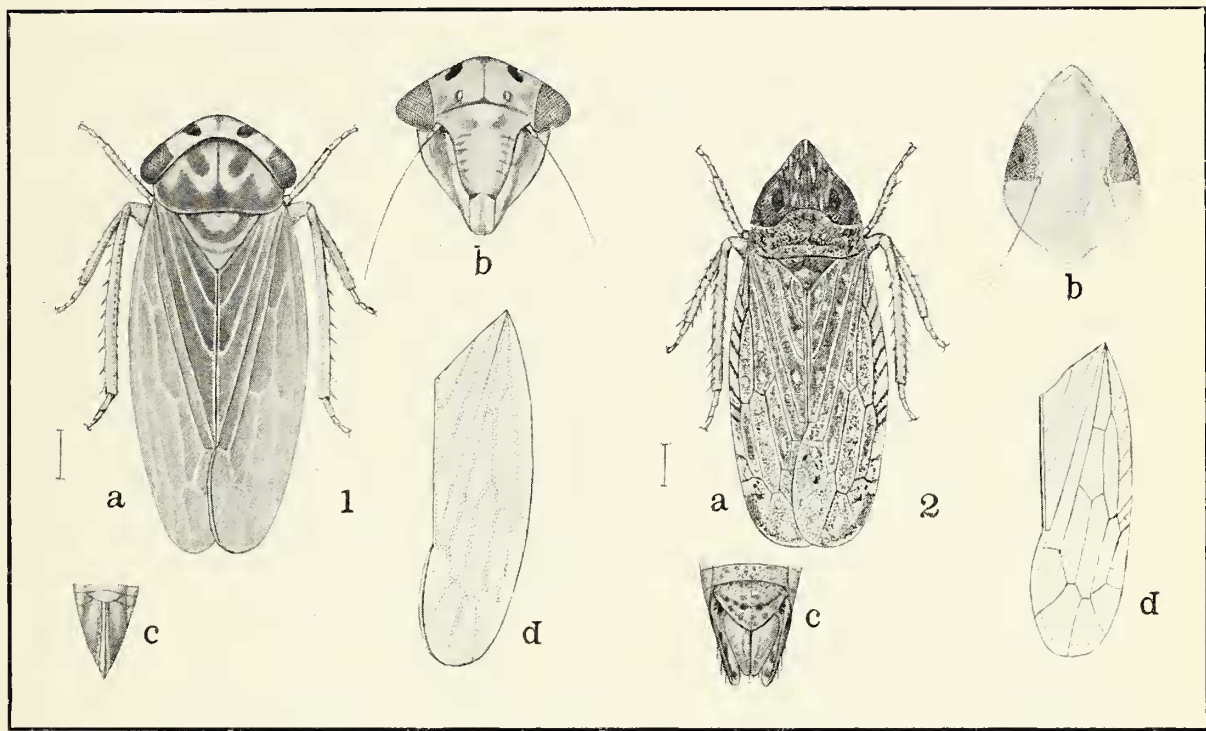
*Thamnotettix, Euscelis, Deltocephalus.*



## EXPLANATION OF PLATE LIX.

Figures reproduced from drawings by Madame Thérèse Eklom of the types in the Naturhistoriska Riksmuseet at Stockholm.

- FIG. 1. *Bythoscopus lautus* Stål. (See p. 389). (Referable to *Agallia*).  
a, dorsal view; b, face; c, female genitalia; d, elytron.
- FIG. 2. *Deltocephalus marginelineatus* Stål. (See p. 410).  
a, dorsal view; b, face; c, female genitalia; d, elytron.  
(The species is referable to the genus *Platymetopius*).



1. *Agallia lautus* (Stål). 2. *Platymetopius marginelineatus* (Stål).